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Journal of Forestry

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Editorial

As Our Profession Grows

Two accomplishments of our Society during the past year may become milestones in professional development: First, is the adoption of canons of ethics that focus attention on objectives and acceptable methods of achieving them. Second, is the widespread development of Section chapters that extend opportunities for participation in Society affairs. The past year has been memorable in another respect. For the first time in the history of our profession the president has been a forester in the employ of a great private wood-using industry. He was elected primarily because he enjoyed the confidence of the membership. But his election also bespeaks understanding on the part of our members of the role private forestry is to play in our country. That his company permits him time from regular duties to serve the Society is evidence of their desire to aid our professional growth.

Our president has worked hard to strengthen the Society, to improve professional solidarity, and to promote understanding between the Section officers and the Council. The fruits of his efforts were clearly in evidence at the Boston meeting. Those who were fortunate enough to attend felt that this meeting marked a new high for our Society. The individual divisions had full programs with worth-while papers and discussions. The general sessions commemorating the fiftieth anniversary of forestry education were outstanding both in reviewing past accomplishment and looking squarely at the challenge of the future. A spirit of friendship and mutual understanding pervaded the entire meeting.

Perhaps the character of the meeting and particularly the maturity of our profession were best exemplified at the annual banquet. This session was addressed by two university presidents—one from the United States and another from the neighboring province of New Brunswick. Their talks dealing with broad questions of technical education were both well received. For urbanity, general culture, and concern with world affairs one might have imagined himself at a convention of lawyers, educators, industrial executives, or government administrators. In fact, all these groups were represented among our members. From our profession men have risen to prominence in state and federal service, have become educators of note, college presidents, railway presidents, bank presidents, industrial executives, novelists, poets, and leaders in national and world affairs.

American foresters are neither uncouth backwoodsmen nor inflexible crusaders. With the years militancy has given way to more diplomatic means to achieve ends. Narrowness of viewpoint has changed to tolerance for the structure of American economics and polities. Eagerness to win conservation battles has given way to long-term strategic planning to create a political and economic atmosphere in which conservation becomes the recognized pattern of forest use.

But as our profession spreads its wings there are those within our Society who wonder if we are not spreading too far—if forestry by virtue of its success in conquering new fields were not in danger of disintegrating as a profession. They feel the need for recognized limitation. They say with plausibility, that unless we can define our profession we do not have a profession. They see foresters spreading into such fields as wood technology, timber engineering, logging, lumber manufacture, lumber distribution and sales, wood preservation, wood machining, and fabrication. They see forest land managers encompassing within their scope game management, range management, recreation management, and watershed management. They see our forestry schools bending their training to fit men for these wide fields and necessarily reducing emphasis on silviculture, forest protection, and forest management. They fear that if our Society accepts such men our profession

will lose its sense of direction, and its identity in the public mind.

Their concern is important. For good or ill forestry training in the past was shaped to a large degree by the U. S. Civil Service examinations. For good or ill, it is now being guided by Society accrediting rules. But accrediting, however strong its influence, cannot oppose a stronger influence—the demands of the jobs that need to be done. If we hold rigidly to a narrow concept of forestry we will find our Society breaking up. Already its unplanned parenthood has given birth to a society of wildlife managers, a forest products research society, and a society of range managers. Will we see also societies of forest pathologists, forest economists, fire control men, private foresters, and logging engineers? Were this to happen it will disperse rather than concentrate interest, augment rather than compose misunderstandings, weaken rather than strengthen forest conservation activities.

Should we not think less of what a forester is and does, and more of the objectives forestry seeks to achieve? What promotes forestry objectives might properly be appropriate to the training of a forester.

Many hard facts must be faced by foresters. Timber scarcity has come to the United States. It will be with us a long time. It brings a heavy responsibility to foresters and industries to maintain the competitive position of wood in view of increasing costs and declining output of labor. The mechanization that would increase labor output is impeded by the low yields from cutover lands. Better forest practice is urgent. Stumpage, the only source of money available to pay all costs of growing timber, retains but a small fraction of the wood consumer's dollar. Stumpage values can be increased only by increasing the price of the final product or by increasing the efficiency of harvesting, processing, and distributing steps that lie between the forest owner and consumer. The spread in price today is wide. It can be narrowed only by better management of those operations that absorb 80 to 95 percent of the consumer's dollar. Obviously intelligent management applied in these fields offers greater prospect of high financial returns than equal skill applied to silviculture protection and forest management. It may vastly increase net returns to the timber grower. Foresters would be blind to self-interest were they to shun these fields. Greatest economy appears to lie in integration of timber growing with forest utilization. The forest owner who is in a position to sell his timber as rough and finished lumber, veneer bolts, turning squares, small dimension stock, delivered pulpwood, peeled poles, posts and piling, and other processed commodities usually has an outstanding advantage over one who must sell only stumpage. Is it not wise therefore to train young foresters in all these fields and in integrated production?

All admit that industrial and government administrators of land exercise great power of decision to further or obstruct forestry. In so far as such leaders are imbued with sympathetic understanding of forestry objectives, the future of our profession is bright. We are proud to recognize those from our ranks who now occupy important executive posts in government and industry. Would it not also be wise therefore to include in foresters' training the subject matter and exercises that would help them to achieve posts or leadership in business and government? Economics, history, government, public administration, business organization, and personnel management then take their place on a par with silviculture and forest management.

Specialization to be sure can be neglected only at peril to the profession. But specialization to be of maximum benefit must be built on a broad basic understanding of the objectives of our profession and their relationship to human welfare. Every forester whether specialist or general practitioner should have basic understanding of business methods and of governmental responsibilities and limitations. He should understand how forestry objectives may be achieved within the framework of business and government. The tasks that lie ahead of foresters in our own country and abroad call for sound training in those activities that control processing, distribution, and use of forest products as well as protection and management of the basic resource. Greatness of our future will be achieved not by restricting our profession, but by broadening its base to include those activities needed to tie forestry intimately to the needs of mankind. May we have the wisdom to develop our thinking to this end.

A Regional Study of Lumber Use in Housing

Henry J. Vaux and Richard H. May

Respectively, lecturer, School of Forestry, University of California, Berkeley, (formerly forest economist, California Forest and Range Experiment Station), and forester, California Forest and Range Experiment Station, maintained by the Forest Service, U. S. Department of Agriculture, at Berkeley, in cooperation with the University of California.

Studies of the amount of wood used in various types of consumption are fundamental to much long range forest planning and to a clear picture of changing demands for forest products. Wood use was examined in 5,603 new residential buildings erected in California during 1946. Using methods which appear to have application to other areas and other classes of wood consumption, estimates were made of the average volume of lumber required per dwelling unit, and of the effects of kind of dwelling, type of construction, dwelling size, design, and trends in consumption on such use.

BEHIND every discussion of basic forest policy lie certain assumptions as to the long-run objectives of American forestry. One of these objectives is the provision of supplies of wood adequate to meet future needs or demands for forest products. This objective is usually specified in the form of a growth goal—the quantity of timber which we should aim to produce annually during future decades. Growth goals assumed by different people may vary considerably and for a variety of reasons. But the starting point in developing any growth goal related to prospective needs must always be the facts of market demand. A fairly detailed knowledge of past and present forest products consumption is fundamental to the development of sound policies for present and future handling of the nation's forest resource.

Although consumption economics is a recognized field of specialization in which a large amount of investigative work has been done, the forester soon finds that the usual study of consumption emphasizes the type of service to the consumer (e.g., food, housing, recreation) rather than the physical products consumed (such as lumber, steel, and wheat). For this reason, the forester has had to undertake special studies of his own to interpret existing data on consumption. A long series of reports by the Forest Service, culminating in the 1946 study of potential requirements for timber products,[1] testifies to the urgent need for converting factors which will permit us to translate demands for housing, transportation, and other goods and services, into demands for wood products.

But repeated and intensified studies of wood use per unit of product are needed if we are to have a clear picture of consumption and the factors affecting it. The methods and findings of a study of lumber use in new home construction in California in 1946 indicate both the problems involved in developing satisfactory wood-use converting factors and some of the dynamic influences which affect them. Although the data are from a single state, the methods used and many of the results may be paralleled elsewhere.

Factors Affecting Lumber Use Per House

The volume of lumber needed to build the "average" dwelling unit[2] in an area at any given time is a function of several variables. It depends on the kind of dwelling (whether one-family, two-family, or apartment type), the type of construction used, the size of the dwelling unit, and its major design characteristics.

A dwelling unit in an apartment house ordinarily requires less lumber than is needed for a one-family home. Apart from the fact that apartment units are usually smaller than home units and may be of different structural type, apartment buildings have considerably less exterior wall surface per dwelling unit. All these things reduce lumber requirements. Thus, the percentage of new units which are apartments will have a significant effect on lumber requirements for the "average" dwelling unit.

Variations in type of construction cause differences in wood use ratios because of shifts in the kind of structural material used. For example,

[1] U. S. Forest Service. Potential requirements for timber products in the United States. Report No. 2 from a reappraisal of the forest situation. Washington, 1946. 70 pp. (Processed.)

[2] A "dwelling unit" means living space designed for occupancy by one family.

a house framed entirely of wood requires more lumber per unit of size than does a concrete block structure. And a wood siding exterior calls for more lumber than a stucco or brick veneer. Types of construction vary considerably from region to region, depending on the availability of different raw materials, the severity of the climate which must be met, and other factors. In California the principal types of construction to be considered are (1) wood frame with wood exterior, (2) wood frame with exterior other than wood, (3) reinforced concrete, structural steel, or other fireproof construction (normally used only in apartments), (4) concrete block, and (5) adobe, metal, or other miscellaneous types. The relative importance of these various methods of construction varies considerably from community to community even within the same general region.

The effect of size needs no explanation. Other things being equal, the larger the structure the greater the quantity of lumber required for it.

Finally, important differences in lumber use factors may arise because of differences in dwelling design. We are all familiar with the wooden "gingerbread" effects used lavishly in the 1890's, a type of design that has declined greatly in popularity. Less spectacular but none the less real differences in wood use may result from differences in the pitch of roofs, from inclusion of a built-in garage in the dwelling, from addition of a porch to the structure, or from differences in the interior and exterior decorative effects which are used. The family home is still the least standardized item in most consumers' budgets and the innumerable variations in design which exist must be recognized in deriving satisfactory lumber use factors.

Sampling Methods

Determination of the volume of lumber used in the average residential structure calls, of course, for examination either of sample dwelling structures themselves, or of building plans or bills of materials which fully specify the quantities of lumber needed for such structures. Wherever such plans or bills are available, information can be obtained much more readily from them than from the completed or partly completed structure. Builders' plans are customarily filed with local building inspectors wherever building permits are required. Because of the highly urbanized character of California and the wide area now subject to building permits, it is estimated that less than 4 percent of all new housing units in 1946 were erected on farms or in other areas not requiring permits. In view of this evidence of the representativeness of dwellings covered by building permits, and in view of the much higher costs of field examination of dwellings not covered by permits, sampling in the present study was confined to structures for which building permits were available.

The relations between lumber use and the controlling factors of kind of dwelling, type of construction, dwelling size and design, can be established with satisfactory accuracy on the basis of a relatively small number of representative new dwellings. Unless construction types and designs are unusually varied, 100 structures will yield data adequate to show how lumber use varies with changes in these key variables. But accurate estimation of the kind, type, and size characteristics of the entire population of new houses requires much more extensive sampling. Because the latter characteristics can be readily identified from building permits alone, without recourse to the more time-consuming examination of plans, the problem lends itself well to treatment by subsampling techniques.[3]

In the California study, the new-housing universe was first stratified geographically and by size of community (based on the number of dwelling units reported in the 1940 housing census[4]). This gave eight sampling strata, from which twenty communities were drawn at random. At the building inspector's office in each community, permits were selected at random from among those issued for new residential dwellings in 1946 until the desired size of sample had been built up. The size of sample varied with community size from a minimum of 50 in the smallest communities to over 1,200 in Los Angeles. A total of 3,991 dwelling units (3.7 percent of all new dwellings built in California in 1946) were included in the sample.

Examination of these permits permitted classification of each sample dwelling structure as to type of construction, size, and kind of dwell-

[3] Schumacher, F. X. and R. A. Chapman. Sampling methods in forestry and range management. Duke Univ. School of Forestry. Bull. No. 7, 1942. Chap. VI.

[4] U. S. Bureau of the Census. Sixteenth Census of the U. S.: 1940. Housing. Vol. II. General characteristics. Part 2. U. S. Govt. Ptg. Off., Washington, 1943.

ing (that is, whether one-family, two-family, three-family, etc). The measure of size used was the total permit area. This was defined as the product of the length, width, and number of stories in the structure, all as recorded on the permit. Because few houses are exactly rectangular in floor plan and regular in outline, total permit area usually overstates the actual net floor space in a house by from 10 to 30 percent. However, in the present problem, size was important only as a key to lumber use. Analysis of data for 91 sample houses showed that total permit area correlated just about as closely with lumber use as did actual net floor area. As the former measure usually appears on building permits and the latter does not, total permit area is a much more effective measure of size for use in the present problem.[5]

About 2.6 percent of the sample building permits were selected at random for more detailed examination. Using builders' plans for each structure covered by these subsample permits, careful estimates were made of the volumes of lumber required for each structure. Uses were grouped according to the type of lumber required, as follows: Rough or construction lumber, finishing lumber and trim, flooring, and siding. Use in each of these categories was determined separately. To shorten the otherwise tedious task of computing lumber footages from plans, formulas were developed which reflected lumber use accurately but required a minimum of linear measurements. For example, in standard wood frame construction, the volume of studding required for each floor was computed as

$$\text{Vol. in Bd. Ft.} = (P+I)\frac{H \times D}{S}$$

where P = perimeter of the dwelling in feet, I = length of all inside walls in feet, H = height of studs in feet, D = board feet of lumber per lineal foot of stud (e.g. $\frac{2}{3}$ for a 2" by 4"), and S = the spacing between studs in feet. Adjustments for window and door spaces were found to be unnecessary as these were offset by double studs at corners, door posts, etc. Similar short cuts were devised, tested, and used for computing the footages in sills, girders, joists, rafters, and other structural items, and for door and window casings and sash, mouldings, cupboards, shelves, and other finish items.

[5]Number of rooms is also listed on permits and was tested as a possible size measure. Correlations with lumber use were lower than those obtained with total permit area. But in regions where two or more storied houses are more common than they are in California, it is possible that number of rooms may be a more satisfactory measure of dwelling size than total permit area.

Methods of Analysis

Each building for which detailed lumber-use data were collected was also classified as to kind of dwelling and type of construction, and its total permit area was computed. Straight line regression equations were then computed for each important kind of dwelling and type of construction, showing the relations between total permit area and volume of lumber used. Separate regressions were calculated for rough and construction lumber, finish and trim (including flooring), and siding.

From the entire building permit sample, the proportion of new dwellings in each important kind-of-dwelling and type-of-construction class was determined for each sampling stratum, and the average size of dwelling in each class was computed. Lumber-use factors for each stratum were then calculated from the regression equations described above, using the average dwelling size as the independent variable. Factors for the different strata were then weighted by the proportion of all new dwellings in each, as determined from National Housing Agency summaries, in order to arrive at average factors applicable to all new 1946 dwellings in the State.

1946 Lumber Use

The average new dwelling unit erected in California in 1946 contained only 8,700 board feet of lumber. Of this, about 6,440 board feet was rough and construction lumber, 1,910 board feet was finish or trim, and 350 board feet was wood siding. These averages reflect a composite of one-family, two-family, and apartment units. For the average one-family home, total requirements were 8,920 board feet, consisting of 6,680 board feet of rough and construction lumber, 1,980 board feet of finish and trim, and 360 feet of wood siding. The sampling error (2σ) of these estimates is less than 3 percent.

The size of single family dwellings varied significantly in different localities. In the San Francisco Bay Area outside of San Francisco itself, the average one-family home had a total permit area of 1,530 square feet. At the other

extreme, the average home in small communities in southern California contained less than 900 square feet of permit area. The average size of all new one-family dwellings in the State was estimated at 1,150 square feet total permit area. This corresponds to about 850 square feet of actual floor space.

Eighty percent of the new units were one-family homes. Almost two-thirds of these were of conventional wood frame construction with stucco or other non-wood exterior. An additional one-fifth were wood frame with wood exterior. Only ten percent of the one-family houses were concrete blocks, adobe, or other types where wood was not the principal structural material.

The way in which construction lumber requirements increase with size of dwelling and vary with type of construction is shown in Fig. 1. The larger use in northern California one-family stucco houses is due to the fact that wood wall sheathing is used under stucco in that area, but not generally used elsewhere in the State. The chart reflects the fact that houses without a wood frame use only 50 to 60 percent as much rough and structural lumber as wood frame dwellings of equal size. The

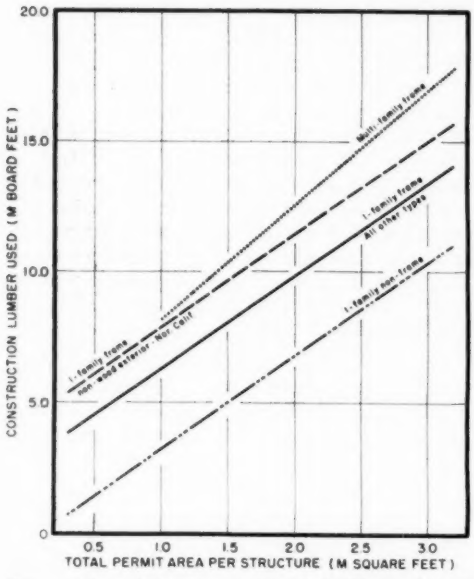

FIG. 1.—Net relationship of size of dwelling and type of structure to the volume of construction lumber used in sample new California dwellings.

quantity of finish and trim used depended almost entirely on the size of dwelling. Differences in type of construction had no significant effect on the use of finish and trim. (In this connection it should be noted that no fireproof structures were included in the sample.)

There was great variability in total lumber use between different classes of construction. The range of this variation may be judged from the fact that the average wood-frame-wood-exterior one-family house in San Francisco required 12.6 M board feet. At the other extreme, the average non-wood-frame one-family dwelling in small southern California communities required barely one-third as much lumber, or 4.3 M board feet.

Trends in Use

Studies of wood-use factors attain their greatest interest for foresters when they have been extended over sufficient periods of time to permit some analysis of trends. In the present instance, some data were available for the early 1930's which, though perhaps not entirely representative of average building conditions during that period, do provide some interesting comparisons.[6]

A survey in nine California cities indicated that only 7 percent of the houses built between 1927 and 1933 had wood exteriors. According to the 1946 survey, 27 percent of new dwelling structures built in that year had siding primarily of wood. There seems little doubt that wood exteriors have increased significantly in popularity during the past 15 years.

On the other hand almost 10 percent of the new homes built under permit in 1946 were of nonwood frame construction. Almost all of these were concrete block or Quonset structures, types which were not on the market in appreciable volume prior to the war.

Evidence on the incidence of apartments indicates that the proportion of all new dwelling units which are in apartment type structures is not very different now than it was in the early 1930's. The size of the average dwelling has, however, undergone a significant reduction. Comparison for four cities of the average permit area of dwellings erected in 1946 with that of

[6]Josephson, H. R. Future wood requirements in California. 1935. Unpublished manuscript in files of California Forest and Range Experiment Station, Berkeley, Calif.

those erected during the period 1929-1934 shows a decline in area of about 15 percent. In addition, ceiling heights which were typically 8'6" in 1933 are now typically 8'2". Taken together, these reductions in cubage amount to about 20 percent, and they suggest a comparable reduction in average lumber use.

Evidence on the extent to which economies and substitution have affected lumber use in dwellings of standard construction is by no means conclusive. However, analysis of limited samples of wood frame structures built in 1933 and 1946 (Fig. 2) suggests that, apart from changes in size, there has been a reduction of perhaps 10 percent in the volume of rough and construction lumber required for comparable structures. At the same time, requirements for finish and trim were apparently about the same in 1946 as they were in 1933, for buildings of equal size.

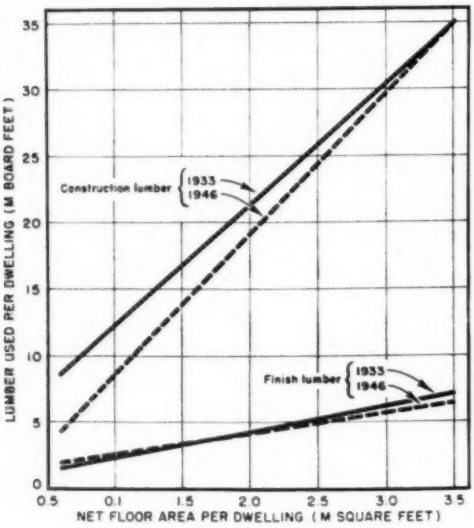

FIG. 2.—Shifts in the use of construction and finish lumber in sample single family dwellings in northern California: 1933 to 1946.

In sum, total lumber requirements for the average single family home in California declined about one-third between the early 1930's and 1946. It is pertinent to ask, therefore, whether the outlook is for continued drastic reduction of lumber use ratios in the housing field.

As has been indicated above, a large part of the observed decrease in wood use resulted from There appear to be definite limits to further size reductions. The average number of rooms per dwelling in 1946 was only 4.64, well below the five-room house frequently considered as "standard" for the American family. It is quite possible that, with easing of the housing shortage, there may be a return to a somewhat more spacious type of dwelling. Lowering of ceiling heights is largely a matter of custom or taste and there is no reason to expect a return to the more ample headroom of twenty years ago. On the other hand there are definite physical limitations to further reductions in this dimension of housing. Stabilization of ceiling heights at about present levels seems a reasonable prospect.

Future trends in economies in the use of wood, either through substitution of other materials for lumber in standard frame construction or through increasing popularity of concrete block and other nonwood types is likely to be settled on competitive grounds. If the present high prices and shortages in supply continue, further loss of markets to substitutes seems inevitable. However, if adequate supplies of lumber are made available, and if it is marketed aggressively in terms of both quality and price there seems no reason to fear additional large-scale replacement of lumber as the premier material in the California housing field.

Research in the Economics of Forestry, 1940-1947

William A. Duerr and Henry J. Vaux

Chairman and member, respectively, S.A.F. Committee on Scope and Method of Research in the Economics of Forestry.

The Society's Committee on Scope and Method of Research in the Economics of Forestry here reports on a nationwide survey of recent and current forest-economics research.

As PART of the project on the scope and method of research in forest economics, sponsored by the Charles Lathrop Pack Forestry Foundation and the Society of American Foresters, the project committee began a survey in late summer 1947 of forest-economics research completed, in progress, or planned in the United States since January 1940. The purpose was to learn what agencies were doing this kind of research, what men were engaged in the work, and what subjects were under study. The results of the survey are being included in a bibliography now in process of compilation and are being used to help recruit contributors to the bulletin which is the main focus of the whole project. In addition, these survey results will be incorporated as a chapter of the bulletin; for this purpose they will be filled out and brought up to date by a recanvass of the field just prior to completion of the bulletin manuscript. In the meantime, the findings of the survey at their present stage may be of current interest.

Agencies in the Field

In an effort to ferret out as much as possible of the research in forest economics, the committee wrote letters to nearly 400 different agencies throughout the United States which might conceivably have done or sponsored such research. Letters were sent to all the state agricultural experiment stations; to the schools or departments of forestry, economics, and related subjects at the colleges and universities; to the trade associations, research foundations, trade unions, and forestry and economics societies; to the offices of the state foresters; and to the Washington and field offices of the Forest Service and other likely federal groups. With these letters were enclosed questionnaires calling for reply and for the listing of forest-economics studies, if any. Forest economics was defined broadly to include the value, price, welfare, or other economic aspects of forest-land use or management or the harvesting, processing, marketing, or consumption of forest products or services. Agencies were asked to list every piece of research, not including purely administrative studies, in which forest economics was the principal element.

Seventy-four percent of the agencies canvassed answered the committee's letter. This first return, exceeding all expectations, included so large a share of the agencies likeliest to have done forest-economics research that it was considered unnecessary to recanvass the delinquents immediately. An analysis of the lists of respondents and delinquents leads to the conclusion that the studies reported number between 85 and 90 percent of the total, and in subject matter and other characteristics are highly representative of the total.

Of the 290 replies received to 394 letters, 89 had studies to report, and the total number of studies was 540 (Table 1). Of all studies reported, 50 percent were reported by the U. S. Forest Service; 13 percent by other federal groups; 29 percent by the universities, colleges, and agricultural experiment stations; and 8 percent by all others. The number of studies per agency reporting ranged from 83 and 25 for the Washington office and experiment stations, respectively, of the U. S. Forest Service to less than 2 for state foresters.

As will be brought out more fully later, the individual studies reported vary immensely in character and scope. For example, some are small spot studies of log prices in a county; others are large, continuing forest surveys of a state. In the canvass, a study was defined as the ultimate unit of research work, commonly the reporting unit, and frequently administered in related groups, or projects, the distinction between a study and a project to be borne in mind.

Respondents were asked to list the names of other agencies, if any, cooperating with them on each study. One-third of all studies involved interagency cooperation. The commonest form of cooperation was that between the U. S. Forest

Service and other federal groups—mostly studies of production, supplies, prices, and the like made to facilitate the work of WPB and other war agencies. Other frequently reported cooperation was between the agricultural experiment stations and federal bureaus such as the Forest Service and Bureau of Agricultural Economics, and between schools or departments of forestry and other units at the same institution. Departments of forestry, it appears, often get help from departments of economics or agricultural economics on research by their teaching staff in the economics of forestry.

The group of foundations and societies engage most frequently in cooperation on forest-economics research: 46 percent of the studies led by them were cooperative studies. They were followed by the U. S. Forest Service, with 39 percent cooperative studies. Least frequent cooperators were the trade associations and the forestry schools and departments, the latter because so many of their studies were graduate theses and therefore one-man jobs.

Research Workers

In this survey of forest-economics research, no attempt was made directly to evaluate either the competence of the work or the magnitude of studies. In the present section and the final section of this report, however, some findings will be given that throw light indirectly on these questions.

Agencies canvassed in the survey were asked to list the names and academic degrees of the leader and other major workers, if any, on each study. This they did for 493 studies, the remaining 47 being reported anonymously.

The names of 455 different persons were listed as taking a major part in the studies. Of these persons, 295 were study leaders. The numbers of workers who led different numbers of studies during the 8 years 1940-1947 are as follows:

1 study	221 leaders
2 studies	31 leaders
3 studies	14 leaders
4 or more studies	29 leaders
Total	295 leaders

Obviously forest economics is a field of research in which a great many persons engage in passing. A relatively small number of workers confine a large share of their effort to the field. In the group of workers who led three or more studies during 1940-1947, 31 led at least one substantial piece of research. These 31 men may be

TABLE 1.—QUESTIONNAIRES MAILED AND RETURNED AND FOREST-ECONOMICS STUDIES REPORTED, BY TYPE OF AGENCY

Type of agency	Questionnaires mailed	Respondents Replying	Respondents Reporting studies	Studies reported[1]
	Number			
U. S. Forest Service				
Washington office			1	83
Experiment stations			7	173
Regional offices			5	15
Total Forest Service	22	20	13	271
Other federal agencies				
Washington offices			7	35
Field offices			12	33
Total other federal	64	51	19	68
State forestry agencies	43	28	9	17
Trade associations	55	37	6	14
Research foundations, trade unions, forestry and economic societies	20	17	4	13
Schools and departments of forestry	45	34	11	92[4]
Departments of economics, business administration, sociology; bureaus of research[2]	96	66	11	26
Agricultural experiment stations[3]	49	37	16	39
All agencies	394	290	89	540

[1]Studies completed, in progress, or planned since the beginning of 1940 and up to the time of reporting (mid- to late 1947).

[2]This is the academic group other than forestry and outside the agricultural experiment stations.

[3]All departments except forestry. Principal departments reporting were agricultural economics, farm management, agricultural marketing, and rural sociology.

[4]Of the 92 studies, 50 were for graduate theses, 42 were made by members of the teaching or research staff.

thought of as comprising the active nucleus of forest economists during the period.

Within the group of study leaders, 57 percent had advanced academic degrees, more than a third of these being doctor's degrees (Table 2). Among doctor's degrees, those in economics and in forestry predominated, with other social science, mostly agricultural economics, falling in third place. The great majority of master's degrees were in forestry. About half of the bachelors were foresters, and most of the rest were graduates in liberal arts. Roughly 6 out of 10 study leaders were foresters by training.

The South falls behind the North and West (refer to Figure 1) in the proportion of study leaders with advanced academic degrees:

	Percent
North	64
West	61
South	47

Subject Matter

Of the 540 forest-economics studies reported, 61 were integrated resource surveys of an area, 59 dealt with the lumber industry, 42 with marketing, and 40 with the costs and returns of forest management. These groups of studies made up well over a third of the total number. All major subdivisions of forest economics, however, were represented in some degree among the studies reported (Table 3).

About two-thirds of the area-resource surveys were reported by the Washington office and experiment stations of the U. S. Forest Service and formed a part of the nation-wide forest survey. The remainder were reported by every other type of agency and dealt with areas ranging from a county to the whole United States (national aspects of the American Forestry Association's "appraisal"). Mere timber cruises or other such enumerations were not counted as research. The studies of the lumber industry ran heavily to federal surveys of production, stocks, and their causal factors, most of these being part of the wartime lumber-supply program. There was, however, a liberal sprinkling of sawmill-cost studies, and of continuing trade-association surveys of output, orders, shipments, and stocks. Of the 42 marketing studies, 12 dealt with the problem of finding suitable outlets for timber, especially farm timber, and nearly all these studies were made by forestry departments or agricultural experiment stations; 10 were concerned with rail or truck transportation; the remainder divided about equally between studies of foreign trade and studies of the geography or agencies of distribution. The preponderance of the forest-management costs-returns studies were based on continuing records from permanent plots or tracts.

Several of the less well represented groups of studies call for some explanation or comment. In the 35 studies of particular forest industries other than lumber and pulp, 17 different industries were represented, veneer and plywood, poles and piles, and tanbark being foremost, though such diverse lines as pipe burls, shuttle blocks, naval stores, and maple syrup were also included. All but three of these studies were reported from the East.

Of the 28 studies of requirements, consumption and demand, only 2 were area studies and the remainder were product studies, dealing chiefly with lumber. Fifteen of these product studies were made in connection with the nation-wide forest survey, and most of them were reported by the Washington office of the U. S. Forest Service.

In the forest-management field, besides the studies of costs and returns, two other groups were recognized. The 33 studies of status, principles, and policy dealt for the most part with the problems and opportunities of private forest management in an area, or with methods of arriving at profitable management decisions, es-

TABLE 2.—ACADEMIC DEGREES OF FOREST-ECONOMICS STUDY LEADERS

Degree	Forestry	Economics	Other social science	Other, not social science	All fields
			Percent		
Doctor's	7	8	4	2	21
Master's	30	2	4	Negl.	36
Bachelor's	20	—	22	—	42
Less than bachelor's	—	—	1	—	1
All degrees	57	—	43	—	100

pecially in the choice of products to be grown or harvested. Only 3 of these studies treated public forest management as the principal subject. The 11 studies of protection and administration included 5 on fire; 4 on insects, diseases, and other destructive agencies; and 2 on the planning of road systems.

The 21 general studies listed as the first item in Table 3 run heavily to area problem analysis and program planning but include also a few items of research in economic theory as applied to forestry. Land-use studies, of which 18 were reported, fell into three fairly equal groups: historical, evaluative (mostly evaluating forest as against nonforest uses), and zoning. Nearly all these studies were conducted by college or university groups. Among the 17 labor and income studies, those dealing with labor productivity and wage rates in particular industries were most numerous; those dealing with income were area studies. Studies of forest ownership covered not only the question of who owns how much land or timber, but also, in many cases, problems of land management and reasons behind management practices. Though only 15 of these ownership studies were reported, nearly all types of agencies and sections of the country were represented.

TABLE 3.—FOREST-ECONOMICS STUDIES REPORTED, BY SUBJECT

Subject	Studies
	Number
General, planning, policy, theory	21
Forest resources and industries of an area (forest surveys)	61
Farm forestry and analogous studies of other owner groups	34
Labor, employment, income, social benefits	17
Land use, land market	18
Forest range, watersheds, and other nontimber resources	9
Forest ownership	15
Forest taxation	26
Forest insurance and credit	5
Status, principles, and policy of forest management	33
Costs and returns of forest management, forest valuation	40
Forest protection and administration	11
Forest industry in general: organization, problems, policy, history, output, etc.	25
Logging	15
Lumber industry	59
Pulp and paper industry	21
Other particular forest industries	35
Timber marketing, transportation, and storage	42
Prices of timber products	15
Cooperative timber management and marketing	10
Demand, consumption, and requirements for timber products	28
All subjects	540

Finally, it should be remarked that although forest resources other than timber were involved in much of the forest-economics research, only 9 studies were reported which dealt primarily with these resources. Three of the 9 studies covered economic aspects of forest-wild-life management, and 2 each concerned water, recreation, and range.

From what has been said in passing about the agencies participating in the various subject-matter fields, it is obvious that some of the different types of agencies give markedly different subject-matter emphasis to their forest-economics research. Research by state foresters' offices leans heavily to resource and wood-using-plant surveys; that by trade associations, to questions of production and labor. The group of foundations and societies appear to interest themselves mainly in broad appraisals of the forest economy or in timber-management studies. The agricultural experiment stations emphasize farm-forestry and related management studies, and, interestingly enough, the departments of economics and other nonagricultural, nonforestry academic groups do likewise.

Departments and schools of forestry, though they put some emphasis on marketing and on the costs and returns of forest management, are notable rather for lack of any particular subject-matter emphasis. This seems to be true at individual institutions as well as for the group as a whole. The forestry schools and departments reported studies in all but one of the 21 major subject fields, the one being labor and income. This may be symptomatic of exploration of new fields on a broad front, possibly in some instances with opportunism and a lack of sharply pointed interest or specialization on the part of graduate advisers.

Among the federal groups, the forest-economics research program of the Forest Service experiment stations centered mainly around three points: the nationwide forest survey, the wartime production and supplies studies, and financial aspects of forest management. Their Washington office emphasized the first two of these, together with the field of forest taxation, in which it reported half of all the studies in the United States. Research by other federal agencies was pointed strongly at the forest industries,

such research being the sole or main field reported by the Bureau of the Census and other groups in the Commerce Department, and by several others, notably the Federal Trade Commission, Federal Reserve System, and Tariff Commission.

Geographic Aspects

Of the 540 forest-economics studies reported, 143 were general or national studies, 136 were regional studies, and 261 applied to individual states or parts of states. When the general and national studies are distributed among the states to which they apply, the state-wise pattern appears as in Figure 1. California and North Carolina are in the lead, with 44 and 38 studies, respectively. Three other states—Arkansas, Tennessee, and Oregon—each have more than 20 studies. Regionally, 208 studies apply to the South, 204 to the North, and 128 to the West.

The three major regions of the United States present some marked differences in subject-matter emphasis in forest-economics research. Western regional and state studies account for most of those reported in the fields of forest valuation and timber-product requirements, and the West shares with the South the vast majority of labor and employment studies. Southern research includes the preponderance of regional and state studies of prices and logging economics. The North and South together account for the lion's share of state and regional studies in farm forestry, forest ownership, costs and returns of forest management, forest industry, taxation, and marketing. Subject-matter fields other than those mentioned are represented fairly proportionately in the programs of the three regions.

Date and Duration of Studies

Respondents were asked to give the starting and ending dates of each study. Unfortunately, some failed to enter starting dates, and, through the committee's negligence, there was lack of uniform understanding as to what constitutes the end of a study. The returns were edited as well as possible to obtain starting as well as ending dates, the latter being dates of final publication or completion of unpublished reports. The following observations are based on the returns as edited.

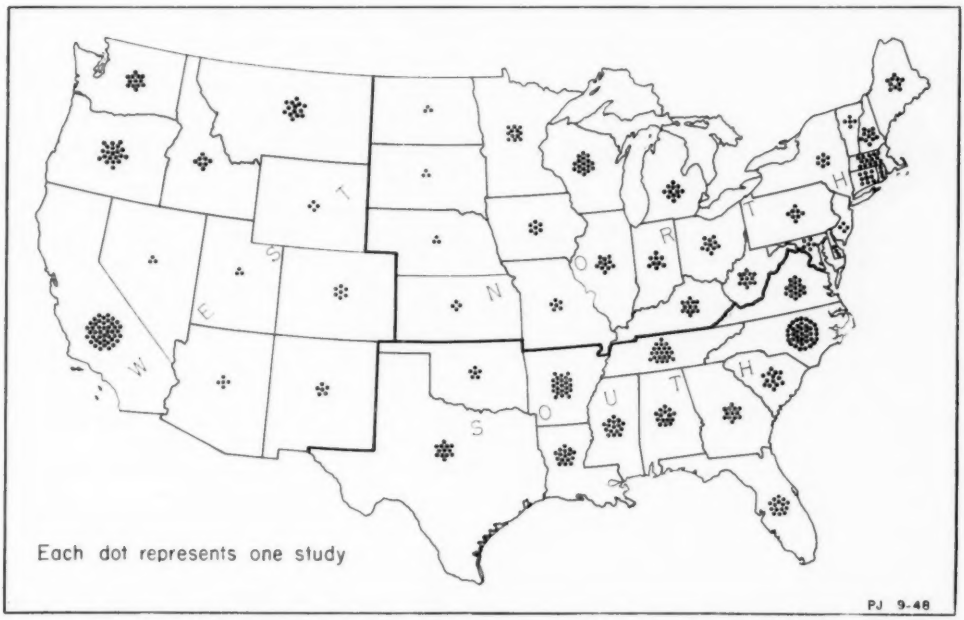

FIG. 1.—Forest-economics studies reported, by state to which the studies apply (general, national, and regional studies are distributed to individual states).

Studies were classified according to their duration. The four classes arrived at, and the percent of all studies in each class, are as follows:

	Percent
Spot studies and those up to 1-year duration	42
2- to 5-year studies	32
6-year or longer studies of definite duration	8
Continuing studies and those of indefinite duration	18
All studies	100

Many of the 1-year and shorter studies were obviously substantial pieces of research. However, at least half of them were apparently lightweight. All in all, no fewer than two-thirds of the 540 studies reported involved very substantial application of time and manpower.

About 450 studies were begun during the 8 years, 1940-1947. Because the survey covered only studies not finished before 1940, these 8 years are the only ones for which comparable data on time of starting are available. (Of the remaining 90 studies reported, most were started before 1940; a few were reported as planned for initiation in 1948.) The approximate number of studies begun in each of the 8 years is listed herewith:

	Studies
1940	60
1941	50
1942	60
1943	35
1944	40
1945	50
1946	70
1947	85
Total	450

The story here is of a falling prewar level, rising temporarily in 1942 with the opening of wartime lines of research, then subsiding to new lows during the war, and finally rising rapidly to new highs during the two postwar years.

The pattern of decline in new studies during the war and increase to fresh highs afterward was followed by all types of agencies with the one exception to be expected: federal groups other than the Forest Service, among which the war agencies were heavily represented. After the war, these agencies were dropping out of the picture while the others were participating in a strong revival of forest-economics research. The postwar boom was especially marked at the U. S. Forest Service experiment stations, where it was a part of general research expansion, and at field offices of other federal agencies, where it apparently signified the entry of new groups, particularly some of the Federal Reserve Banks and Land Banks, into the field. Both these classes of agencies more than doubled the number of new studies in the two postwar years, over the two prewar years.

Along with the postwar entry of new research groups into the economics of forestry and the strong revival in the work of old groups, came shifts in emphasis as to subject matter. Studies of forest industry, which in the two prewar years had comprised 17 percent of all new studies and rose to 40 percent during the war, fell back to 28 percent in the two postwar years. Farm forestry, which was the subject of 6 percent of the new studies in 1940-1941 and dropped to a negligible percentage thereafter through 1945, accounted for 8 percent of new studies in 1946-47. With Congressional authorization and appropriations reviving forest surveys on an enlarged scale, new studies under this project made up a sixth of all new studies after the war, as against less than a tenth before the war. Research in financial aspects of forest management, too, occupied, in postwar programs, a much more dominant position. Forest taxation, on the other hand, which as late as 1940-1941 was a major subject of new work, had dwindled to insignificance by 1946-1947.

Weed Control in Guayule Seedbeds with Stove Oil

Edward D. Clifford

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Wartime shortage of labor led to extensive experiments to determine the efficacy of oil sprays in controlling weeds in Guayule nursery beds. Many of the principles worked out in these tests probably can be applied to control of weeds in the various types of forest nurseries. They will prove of great value should a guayule program again be attempted.

WEED CONTROL proved to be a major problem in the extensive nurseries used for growing guayule for the Emergency Rubber Project. Stove oil was being used in the Salinas and Imperial Valleys in the control of weeds in carrots (*3*). Sinox was being used to control weeds in onions, garlic, and some other vegetables (*4*). With the cooperation of H. A. Holmes, one of the leading vegetable growers in the Salinas Valley, B. J. Abrahams, nursery manager, and the writer made the first oil spraying experiments for weed control in guayule. This work was done at the Quail Creek Nursery near Salinas, California, in the spring of 1942. A few plots were also sprayed with Sinox. The latter proved unsatisfactory for weed control in guayule seedbeds. A knapsack sprayer was used in applying these sprays. Spraying was done on May 26, 1942, and at that time the guayule seedlings had developed four to six leaves and were about 12 days old. The weeds were, for the most part in the cotyledon stage. Results of these early oil treatments were so favorable that further tests were made using a power sprayer. These indicated that it would be possible under favorable conditions to kill most of the weeds in guayule seedbeds with stove oil sprays. To determine the best procedure for spraying guayule seedbeds, factorial experiments were set up to study the effects of pressure, mixture, amount of oil, type, size and number of nozzles, spreaders, height of boom time of day to apply the spray, and the ages of weeds and guayule on resistance of these plants to oil sprays. During 1943 about two thousand nursery beds were sprayed and most of the experiments were repeated at five nurseries namely, Bell Ranch Nursery near Indio, California; Mission Nursery near Oceanside, California; Whittier Nursery near Indio, California; San Mateo Nursery near San Clemente, California and Carlsbad Nursery near Carlsbad, California, Table 1.

TABLE 1.—LOCATION OF EXPERIMENTS, NUMBER OF COMPARISONS, AGE AND KIND OF WEEDS, AND AGE OF GUAYULE

Exp. No.	Location	No. of comparisons	Age of plants		Kinds of weeds
			Weeds	Guayule	
			Days	*Days*	
1.	Bell Nursery, Indio, Calif.	256	1-23	10-23	Pigeon Grass, jungle rice, pigweed goosefoot family, groundsel, sand burr, love gross
2.	Bell Nursery, Indio, Calif.	249	1-24	10-24	Puncture vine, pigeon grass, featherfinger grass, Bermuda grass, alfalfa, nut grass
3.	Bell Nursery, Indio, Calif.	256	1-72	62-72	Pigeon grass, jungle rice, goosefoot family, pigweed, groundsel, sand burr
4.	Mission Nursery, Oceanside, Calif.	256	1-7	1-7	Goosefoot, pigweed, mustard, shepherds purse
5.	Whittier Nursery, Indio, Calif.	256	1-15	1-15	Puncture vine, pigweed
6.	San Mateo Nursery, San Clemente, Calif.	256	1-12	1-12	Mallow, pigweed, goosefoot
7.	Carlsbad, Nursery, Carlsbad, Calif.	108	2-20	5-20	Pigweed, goosefoot, mallow, wild radish, groundsel
8.	Carlsbad Nursery, Carlsbad, Calif.	284	1-14	1-14	Sams is in Exp. 7
9.	Carlsbad Nursery, Carlsbad, Calif.	316	1-15	1-15	Sams is in Exp. 7

Methods and Materials

Standard guayule nursery beds (4 x 400 feet) were used in carrying out the experiments. Most of the sprayings were made within 2 or 3 weeks after the seed was sown. The beds were sown by standard nursery methods and irrigated as needed by overhead sprinklers. The plot size for most of the experiments was two beds wide and 100 feet long. Two replications were made of all treatments. The location of the plots was determined by use of a random-number table. Two sample counts, 1 by 4 feet, were made in each plot. The location of the sampling plots was also determined by use of random tables. The counts were usually made within 24 to 72 hours after spraying.

In making the counts, the healthy, injured, and dead weeds and guayule were tabulated. In most of the experiments the weeds and guayule were also counted before spraying. In the tables appearing in this paper, only the dead plants of the weeds and guayule are shown. From examinations made after spraying it was found that most of the injured weeds and guayule recovered and grew, although in some cases they were stunted.

A Bean sprayer, Model 3208, was used in applying the oil in all experiments. Each section of the sprayer boom was equipped with five nozzles, spaced approximately 12 inches apart. This sprayer has a rated output of 6 to 7 gallons per minute at 300 to 350 pounds pressure. The sprayer was pulled with a Farmall, Ford or Cletrac tractor. From reports by Raynor (*1, 4, 5,* and *6*) and others the type of nozzle best adapted to weed control is one that produces a fan-shaped spray. At least two such styles of nozzles are available in several size orifices. In most of the experiments the Bean Number 2 and Number 3 weed control nozzles were used. In an experiment these nozzles were compared with the Monarch Fan Nozzles numbers .039 and .046. A commercial grade of stove oil was used. The oil used at the Bell Ranch Nursery and the Whittier Nursery was purchased from the Krebs Oil Company and the Sturdy Oil Company, while that used at the Carlsbad, Mission and San Mateo Nurseries was purchased from the Shell Oil Company. Analysis showed that these oils varied only slightly from each other, Table 2.

TABLE 2.—ANALYSIS OF THE STOVE OIL USED[1]

	Brand of stove oil		
	Krebs	Shell	Sturdy
Gravity, °A.P. I	37.8	38.6	34.7
Flash Point, COC, Degrees F.	130	125	145
Viscosity, S.U. @ 100° F.	33.4	33.3	36.0
Unsulphated residue, percent	85.0	86.0	82.5

[1]Made by the Twining Laboratories, Fresno, Calif.

Results

Pressure

Pressure is usually varied to change the size of the droplets (*5*). However, at pressures used in these experiments, (200 to 250 and 350 to 400 pounds) the change in pressure does not have much effect on the size of the droplets. The main effect of increasing the pressure in these experiments was to increase the amount of material applied. The percentage of weeds killed increased with the increase in pressure, with little or no effect on the percentage of guayule killed. Where the other factors were constant, an increase in pressure gave a slight increase in weeds killed.

Nozzles

The size of the orifice in the nozzle governs the discharge rate, and in the case of the Bean nozzles to some extent the degree of spread. By changing the size of nozzles the amount of material applied to a bed can be changed with the pressure, speed and mixture remaining constant. Under the same conditions of pressure the Bean Number 3 nozzle discharged approximately 80 percent more material than the Bean Number 2 and has a wider degree of spread. The Bean Number 3 nozzle gave consistently better weed control than Number 2, table 3.

In one experiment five different nozzles were used. The amount of material applied was the same for each nozzle, Table 4. In this experiment the Bean Number 3 nozzle gave the highest percentage of kill.

In one experiment a 24-inch spacing of nozzles was used in comparison with the 12-inch spacing. The latter required five nozzles per boom whereas the 24-inch spacing required three nozzles per boom. The Monarch .046 nozzle was chosen because of its higher discharge rate. It was possible to use fewer of these nozzles and apply the desired amount of oil and yet operate the sprayer at a high rate of speed. This nozzle gives good coverage with the nozzles spaced 24 inches apart and a boom height of 18 inches, whereas with the same boom height and a spacing of 12 inches a double coverage is obtained.

TABLE 3.—KILLING OF WEEDS (W) AND GUAYULE (G) IN RELATION TO SPRAYING PRESSURE, NOZZLE USED, MIXTURE OF SPRAY AND SPEED OF TRAVEL

Exp. No.	Spraying pressure				Nozzle used				Mixture—Parts of oil to water						Speed of sprayer			
	200-250		300-400		Bean No. 2		Bean No. 3		1:3		1:4		1:5		2 ft. per sec.		3 ft. per sec.	
	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G
	Percentage killed																	
1	80	5	86	3	80	4	86	4	89	5	83	2			85	5	81	3
2	59	3	72	4	55	3	75	4	—	—	72	5	60	2	72	5	60	2
3	31	1	32	T1	30	T	33	T	32	T	30	1			41	T	22	T
4	88	1	86	2	81	1	92	3	—	—	87	2	87	2	92	3	82	1
5	21	1	24	1	14	1	32	2	—	—	22	1	24	1	27	1	18	1
6	28	T	25	1	22	T	40	T	—	—	35	T	26	T	34	T	27	T
7	48	T	51	1	44	1	55	T	—	—	40	1	55	0	45	T	55	1

The percentage of weeds killed with the 12-inch spacing was significantly greater than with the 24-inch spacing, 80 percent against 65 percent. A 12-inch spacing or five nozzles to a boom with a 24-inch boom height will give double coverage with all of the above nozzles except the Bean No. 2. The Bean Number 2 will give double coverage if the boom height is raised to 28 inches

Speed of Machine

The speed at which the machine travels is another means of regulating the amount of material applied. It is an important factor affecting the cost of the spraying operation. In most of the experiments, two speeds were used, namely, 2 and 3 feet per second. The slower speed gave a higher percentage of kill on weeds in six of seven experiments. There was a tendency also for the percentage of guayule killed to be slightly higher at the slower speed, Table 3. The faster speed results in applying approximately one-third less material per bed.

Mixture

The mixture used is a means of regulating the amount of oil applied. Low water consumption means less lost time in filling the sprayer and thus lower cost of spraying. The problem of coverage must also be considered if good weed kill is to be secured.

TABLE 4.—EFFECT OF DIFFERENT NOZZLES APPLYING THE SAME AMOUNT OF OIL UPON THE PERCENTAGE OF WEEDS AND GUAYULE KILLED. EXPERIMENT 8, CARLSBAD NURSERY

Nozzle	Weeds		Guayule	
	A.M.	P.M.	A.M.	P.M.
	Percentage killed			
Bean No. 2	87	86	T	5
Bean No. 3	91	90	3	3
Bean Cone	81	67	0	2
Monarch No. .039	89	71	T	T
Monarch No. .046	78	53	1	T

A mixture of 1 part oil to 3 parts water is compared to a mixture of 1 : 4 in two experiments. In both cases the percentage of weeds killed was higher for the 1 : 3 mixture but this was not true for guayule, Table 3. In five experiments a mixture of 1 part oil to 4 parts water was compared with a 1 : 5 mixture. In most cases the 1 : 4 mixture gave a higher percentage of weeds killed. In experiment 5 there was no significant difference. In experiment 7 the 1 : 5 mixture gave a significantly higher percentage of weeds killed. This was due to the fact that the 1 : 5 mixture was applied while the weeds were in the cotyledon stage or just developing true leaves, while due to breakdown of equipment the 1 : 4 mixture was not applied until 2 days later when the weeds had developed several true leaves and were more resistant to oil. In one experiment the same amount of oil was applied per bed regardless of the mixture, Table 5. In this experiment the 1 : 4 mixture gave a somewhat higher percentage of weeds killed. Perhaps this was due to more liquid being applied in the 1 : 5 mixture and this was in excess of that needed to wet the weeds. Thus the excess ran off the leaves, resulting in less oil actually being applied to the weeds. In order to get good kills, it is necessary to give the weeds a complete wetting. This is especially true with the more resistant weeds.

TABLE 5.—COMPARISON OF 1 PART OIL TO 4 PARTS WATER TO 1:5 MIXTURE, APPLYING THE SAME AMOUNT OF OIL PER 400 FT. BED (BED 4 × 400 FEET = 1,600 SQ. FT.). EXPERIMENT 8, CARLSBAD NURSERY

Mixture	Gals. of oil	No. of comparisons	Percentage of kill	
			Weeds	Guayule
1:4	1.5	136	80	1
1:5	1.5	148	72	T
1:4	2.2	136	86	2
1:5	2.2	148	81	2

TABLE 6.—WEEDS AND GUAYULE KILLED BY APPLYING DIFFERENT AMOUNTS OF OIL PER 400 FOOT BED[1]

Gallons of oil	Age of weeds in days						Age of Guayule in days					
	m 1-7	1-12[2]	1-15[3]	1-23	1-24[4]	1-72[5]	1-7	1-12	1-15	10-23	10-24	62-72
	Percent killed											
.8	77	8	8	—	38	—	T	T	T	—	T	—
1.0	80	24	11	75	43	46	T	T	1	3	3	2
1.5	88	23	28	83	60	18	2	T	2	2	3	0
2.0	91	36	43	87	73	37	2	T	2	3	4	2
2.5	92	48	35	89	91	49	3	T	1	3	3	3
3.0	94	52	48	89	73	25	6	T	3	3	4	3
3.7	96	48	32	91	84	57	5	T	2	8	10	4
4.7	—	—	—	95	—	28	—	—	—	5	—	5

[1]Based on 32 comparisons in each treatment.
[2]Weeds mostly mallow which is resistant to oil spray even in cotyledon stage.
[3]Weeds mostly puncture vine that had developed true leaves and started to run.
[4]First spraying.
[5]Second spraying. Most of the weeds left were old and resistant to oil.

Amount of Oil Applied per Bed

The amount of oil applied is governed by the mixture, speed or rate sprayer travels, pressure and nozzle used. In most of the experiments these factors were varied, with the result that a wide range of amounts of oil were applied, varying from .8 gallons to 4.7 gallons per 400-foot bed (1600 sq. ft.). The percentage of weeds killed usually increased with the amount of oil applied. Where the weeds were under 2 weeks old from 2 to 2.5 gallons of oil per 1600 sq. ft. gave excellent control, with a low percentage of killing in guayule, Table 6. Under the same conditions the use of over 3 gallons of oil did not materially improve the weed control as compared with 2.5 gallons, but did increase the percentage of guayule killed. In the experiments where the weeds were older or more resistant to oil sprays, 3 or more gallons of oil were necessary to obtain good control.

Table 6 shows that less oil in some instances gave better control. That was due to the type of weeds in the areas and to the fact that only a few weeds occurred in the plot.

In one experiment four amounts of oil were applied per bed; namely, one, two, two-and-half, and three gallons. The two and two-and-half gallons of oil per bed gave almost identical results, three gallons slightly better but not enough to warrant the use of the extra oil. One-and-one-half gallons gave the lowest percentage of weeds killed.

Where spraying can be done within 2 weeks from sowing, 2 to 2.5 gallons of oil per bed (1,600 sq. ft.) will give excellent control in most cases. Where the spraying is done after 2 weeks or the weeds are of the more resistant type, from 2.5 to even 4.7 gallons of oil may be necessary per bed. These higher rates of application will increase the percentage of guayule killed, but in many cases this would be justified when there is lack of labor or a heavy weed infestation

Spreaders

To determine whether the use of spreaders or emulsifiers would increase the weed kill, casein powder, blood albumen, and soap were added. The latter two were used on a much smaller scale than the casein powder. Blood albumen proved impractical as it was slow to dissolve. Soap seemed to reduce the effectiveness of the oil and also required considerable time for thorough mixing with the oil and water.

Casein was very easy to use, requiring very little if any extra time to prepare. The use of casein at the rate of 8 ounces per 100 gallons of spray material increased the weed kill in all cases, Table 7. Casein was relatively less effective when the spraying was done in the morning. In all cases, the use of casein powder increased the percentage of weeds killed sufficiently to offset the added cost.

Casein used in the spray did not increase the percentage of guayule killed. There does not appear to be any consistent interaction between spreaders and other factors other than the time of day at which the spray was applied.

Time of Day

In all of the experiments the treatments were made in both the morning and afternoon. Table 7 shows the effect of time of day on the percentage of weeds and guayule killed. In all cases there was a higher percentage of weeds killed when sprayed in the morning. Why spraying in

TABLE 7.—EFFECT OF SPREADERS AND TIME OF DAY ON WEEDS (W) AND GUAYULE (G) KILLED

Exp. No.	Spreader				Time			
	Casein		None		A.M.		P.M.	
	W	G	W	G	W	G	W	G
	Percentage killed							
1	87	3	79	5	86	5	80	3
2	72	4	57	3	69	4	63	2
3	34	T	29	T	34	T	29	T
4	92	2	82	2	98	2	81	2
5	28	2	16	1	24	1	22	2
6	37	T	24	T	37	T	24	T
7	56	T	44	1	51	T	47	2

the morning gave a higher kill is not known. The percentage of guayule killed does not appear to be affected by the time of the day the spray was applied.

Boom Height

The height of the spray boom influences the coverage obtained from the nozzles (*6*). At the heights used in these experiments, 18, 24, and 28 inches, good coverage was obtained with all nozzles and the percentage of weeds killed varied only slightly for the different boom heights.

Time Interval Between Spraying and Irrigation

It has been the practice in most nurseries to delay the irrigation for approximately 24 hours after spraying. This is not always desirable, especially when the beds are sprayed while the guayule seed is still germinating.

To determine how long irrigation should be delayed after spraying an experiment was conducted using five different time intervals between spraying and irrigating. The experiment was repeated in the morning and afternoon. The percentage of weeds killed in both the morning and afternoon applications increased as the time between spraying and irrigation was increased up to and including 5 to 8-hour periods. Table 8. The difference between the 3 to 5 and 5 to 8-hour periods was not significant. The percentage of weeds killed in the 24-hour period was practically the same as for the 1 to 3-hour period in the morning. There was no significant difference in the 3 to 5, 5 to 8, and 24-hour period for afternoon applications. The 5 to 8-hour period consistently killed a higher percentage of guayule but the difference was not significant. From this it appears that the seedbeds can be irrigated from 3 to 8 hours after spraying without reducing the percentage of weeds killed.

TABLE 8.—EFFECT OF TIME INTERVAL BETWEEN SPRAYING AND IRRIGATION ON THE WEEDS AND GUAYULE KILLED

Time elapse	No. of comparisons	Weeds killed			Guayule killed		
		A.M.	P.M.	Ave.	A.M.	P.M.	Ave.
		Percentage					
30 to 60 min.	64	68	60	64	3	T	2
1 to 3 hrs.	61	83	57	70	3	T	2
3 to 5 hrs.	64	93	59	76	1	2	2
5 to 8 hrs.	64	95	66	81	4	4	4
24 hrs.	64	82	63	72	2	1	2

Age of Weeds and Guayule

In these experiments the sprayings were made from 7 to 25 days after seeding. A second spraying was made in one case 72 days after seeding. The highest percentage of weed kill was obtained where the beds were sprayed within 7 to 14 days after seeding and the percentage of guayule killed was not, in most cases, significantly higher than that obtained on the older plants.

In experiment No. 2 at the Bell Ranch Nursery only a very few of the puncture vines were still in the cotyledon stage when sprayed, and a low percentage of kill was obtained, whereas a high percentage of the grasses and other weeds were killed, Table 6. The same thing occurred in experiment 5 at Whitter Nursery. Here the weeds were mostly puncture vine and before spraying was completed they had developed true leaves. At the San Mateo Nursery the principal weed was mallow which is resistant to oil sprays, even in the cotyledon stage. This accounts for the low percentage of kill in this experiment and these results were consistent with those obtained in the large-scale nursery spraying.

Temperature

A high percentage of the weeds were killed where the temperature ranged from 55° to 109° F. At temperatures over 100° F. there was considerably more burning of the guayule leaves. While no experimental spraying was done at temperatures under 55° F., other sprayings were made at temperatures under 55° F. but did not give a satisfactory kill. Weeds were slower in reacting to the oil at the lower temperature

Agitation

The spray material should be properly agitated before spraying is started. The agitation alone does not give a good emulsion but does break up the oil into small globules and distribute these globules throughout the water. When in this condition and subject to pressure and atomized by the nozzle, a good emulsion is

obtained. Samples of spray material were collected in graduate cylinders from the nozzles when the spray tank was full, half full and almost empty. These samples were allowed to stand until the oil and water separated. After 24 hours only a small amount of oil had separated from the water, and it took about 30 days for all of the oil to separate. There was no appreciable difference in the proportion of oil to water in the samples collected from a full, half full and almost empty tank. Agitation should continue while the tank is being filled and for 5 to 10 minutes after filling before spraying is started. It did not seem to make any difference whether the oil was added to the water or the water to the oil, as far as uniformity of mixture was concerned. However, if the water is added to the oil less agitation is required to obtain uniform mixture.

Conclusions

The cost of weeding guayule seedbeds can be greatly reduced by the use of oil sprays instead of hand weeding. The cost in some cases is only 10 percent of that of hand weeding. Under most conditions one could expect an average of about 75 percent reduction in total cost. This cost includes the cost of oil and equipment.

The effectiveness of the spraying depends on several factors:

1. The main effect in increasing the pressure from 200 or 250 to 350 or 400 pounds is to increase the amount of materials applied. At these pressures any increase in pressure affects the size of the droplets only slightly. However, where all the other factors remained constant increases in pressure resulted in better weed control.

2. Size of the nozzle, speed of the machine, and concentration as well as pressure all affect amount of spray material applied per bed. These factors also affect the coverage obtained. Under most conditions from 2 to 2.5 gallons of oil per 400-foot bed (1,600 sq. ft.) is recommended.

3. Casein spreader gave slightly better weed control and can be used to advantage especially when spraying in the afternoon.

4. Nozzles producing a fan spray are best suited for weed control. The nozzles should be spaced 12 inches apart on the spray boom.

5. Boom height affects the coverage obtained from the nozzles. Double coverage is preferred, and this is obtained with a boom height of 24 inches above the beds for most nozzles.

6. Spraying in the morning resulted in a somewhat better weed control; where it is possible to keep up with the weeds by spraying in the morning this should be done.

7. Spraying should be done when the temperature is between 60 and 90 degrees.

8. Beds should not be irrigated until 3 to 8 hours after spraying.

9. Spraying should be done when the weeds are in the cotyledon stage for the highest percentage of weed kill. Most of the more common weeds such as pigweed family, *Amaranthaceae* lambsquarters and other members of the goosefoot family, mustard (*Cruciferae*) family and shepherdspurse (*Capsella bursa-pastoris*) can be completely killed in the cotyledon stage and a fair degree of control obtained after they have started to develop true leaves. Such plants as groundsel (*Senecio vulgaris*), puncture vine (*Tribulus terrestris*) and mallow (*Malva* Spp.) must be sprayed in the cotyledon stage to obtain any degree of control. Guayule appears to be resistant to oil sprays in all stages of leaf development.

10. Mixture should be agitated for at least 10 minutes before spraying.

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Determining the Bark Beetle Hazard of Pine Stands in Northeastern California

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The proportion of trees and volume in trees recently killed by bark beetles, and the proportion of live trees now classified as highly susceptible to beetle attack may be used as indices of beetle hazard in northeastern California pine lands. These same indices afford a basis for determining control measures and estimating their cost.

MANY ponderosa and Jeffrey pine stands throughout the interior range of these two species were severely depleted as a result of persistently aggressive bark beetle infestations during the period 1925 to 1940. The stands in northeastern California lying east of the Sierra Nevada-Cascade range and north of Lake Tahoe were especially hard hit. These stands total 2.5 million acres and comprise about two-fifths of the state's pine resources. Approximately 4.3 billion board feet of pine timber were destroyed, an amount equivalent to 17 percent of the total volume as of 1925. This loss occurred during a prolonged period of abnormally low rainfall, but it is an example of what can and does happen occasionally under natural conditions.

The numerous attempts at pine beetle control by both private and federal timber-managing agencies prior to 1937, although temporarily effective when applied against increasing infestations on limited areas, failed to give permanent control. Craighead et al (*1*) reported these attempts of little value in preventing recurrence of outbreaks over a reasonable period of time. The development of indirect control by sanitation-salvage cuttings in 1937 (*5, 7*) filled this need for a method which would "bug-proof" pine stands by removing from them, and milling certain decadent, or high-risk, trees known to be particularly susceptible to beetle attack. Since then pine beetle control recommendations made for northeastern California by the forest insect laboratory of the U. S. Bureau of Entomology and Plant Quarantine at Berkeley, Calif., have included the following three courses of action, which together cover practically all the control needs normally occurring in this area:

Direct control.—Burning the brood-laden bark of felled currently infested trees to reduce the beetle population in a specified area. This method is most effective in high-value stands on good sites, where the beetle infestations are normally endemic and only occasionally epidemic.

Indirect control.—Treatment by the sanitation-salvage method in situations where epidemic infestations have prevailed over a period of years or where the abundance of high-risk trees coupled with poor growing sites indicates that such infestations are likely to occur in the immediate future.

Heavy utilization cutting.—Heavy cutting to salvage the remaining timber values where persistently heavy infestations, coupled with light stands, make direct control both costly and, in most cases, transitory, and indirect control unwise because of the possibility of leaving a volume which subsequently would be uneconomical to harvest.

The success, and hence the choice, of any of these control methods depends largely upon the beetle hazard of the pine stands being considered. As a basis for control recommendations, therefore, the Berkeley laboratory began a project in 1937, known as the Forest Insect Hazard Inventory, to appraise the beetle hazard of the pine stands in northeastern California.

The field program of the inventory was conducted during the summer months between 1937 and 1940. It was largely an intensive survey of virgin ponderosa and Jeffrey pine stands to obtain measurements for defining the boundaries of different hazard areas and for supplying additional information needed in planning the beetle-control requirements of each area. As a result of this study the procedure of recommending or approving certain control technique was reduced to a simple routine. It was possible to define the areas having normal infestations that could be controlled by direct methods or by some form of sanitation-salvage treat-

ment. The survey also disclosed the areas where the infestations had made such inroads into the stands that control by any method was not economically sound and nothing remained but to salvage the timber left in the stands.

The value of the beetle-hazard classification has been demonstrated in subsequent control operations, not only by the ease with which they were planned and executed, but also by the control results thus far obtained.

Classification by Beetle Hazard

The term "beetle hazard" is used here to express the likelihood of imminent damage to pine stands from beetle infestation. It was known long before the inventory was taken that infestations did not occur uniformly everywhere, and that some areas perennially suffered heavier losses than others. Since any recommendations for control work would be dependent upon the intensity of the current or expected infestations, it was necessary for the inventory to segregate pine-timbered areas according to their relative beetle hazard. Five beetle-hazard classes were established (Table 1) based upon results of a preliminary study of the timber and infestation conditions to be encountered. The hazard rating assigned to each stand was expected to apply for not more than a 15-year period, as a result of certain limitations in the hazard indices to be described later under "Determining the Hazard Ratings."

The hazard classification shown in Table 1 was intended principally for application to mature virgin stands, because they usually present a greater attraction for insects than immature ones and the need for control is therefore more urgent. A certain amount of beetle hazard can and does exist in pine cutover-reserve stands, though it is usually not great because of the predominance of younger age-classes. As these reserves approach maturity again, it is not unreasonable to expect that the beetle hazard may increase. Little, if anything, has been done, however, to measure the beetle hazard of cutover reserves on a scale equaling the present attempt in virgin stands.

An intensive field study was carried on in several localities in 1936 to find an adequate index of beetle hazard. The immediate objective was to find criteria which would (1) indicate beetle hazard directly or serve as an element in determining hazard, (2) provide a basis for arithmetically determining hazard ratings for any and all pine stands, (3) be easily obtained under normal field conditions and by average skilled forest technicians, and (4) allow the inventory to be completed within the time and fiscal allotments set up for it.

A number of factors bearing on the current

TABLE 1.—DESCRIPTION OF BEETLE HAZARD CLASSES FOR PONDEROSA AND JEFFREY PINE STANDS IN NORTHEASTERN CALIFORNIA

Beetle-hazard class and rating	Current beetle hazard	Type of stands	Percentage of occurrence[1]
I—Very low	Net stand growth expected to far surpass insect-caused mortality	Immature and thrifty mature stands with younger age-classes predominating; some mature or overmature stands at high elevations	0.3 13.7
II—Low	Insect-caused stand mortality expected to nearly equal or equal net growth	Thrifty mature stands	13.7
III—Moderate	Insect-caused stand mortality expected to slightly exceed net growth causing some stand depletion	Mature and overmature stands, site III or better[2]	39.7
IV—High	Heavy depletion from insects expected	Mature and overmature stands on poorer sites	33.3
V—Very high	Very heavy depletion expected to reduce merchantable values or to liquidate them entirely	Overmature stands on marginal sites	13.0

[1]As determined in 1940 by the Forest Insect Hazard Inventory on 1,765,000 acres of virgin pine timber type.
[2]In this case timber on site III attains a height of about 90 feet in 100 years.

beetle hazard of pine stands were studied, and two were found which appeared to be significant and which fulfilled the requirements listed above. These factors were (1) the percentage of the volume of pine recently killed by the bark beetles, and (2) the percentage of the present volume of pine occurring as high-risk trees.

The use of past beetle damage as an index of current hazard was aided by an intimate knowledge of past beetle infestations in northeastern California. This information was supplied by a series of sample plots, some of which had been measured annually since 1921. In these plots certain areas consistently had suffered greater year-to-year timber losses from insects than had other areas. Also, pine stands in this area ranged from those which had suffered little damage to those which had been practically wiped out. Presumably the beetles attacked with greater force in some stands than in others because of some environmental features of the stands themselves which, having been so effective in encouraging or discouraging infestations up to the present, could be expected to continue so during the near future. This assumption has since been supported by other studies now being carried on by the forest insect laboratories at Berkeley, Calif. and Portland, Ore. in which different environmental factors have been isolated and measured. These factors have been found to vary significantly in forest areas of different beetle hazard.

The percentage of pine trees in the green stand currently showing symptoms of high risk was selected as an index of hazard about the time that the beetle-risk classification for individual trees (7) was receiving its first tests. Mortality records of trees marked according to this classification have since been kept for periods ranging from 1 to 10 years on sample plots scattered throughout northeastern California. Of 444,000 board feet of beetle-killed ponderosa pine occurring on the plots in one test 371,000 board feet, or 83 percent, was made up of high-risk trees (unpublished report). These preliminary results have since been corroborated and show that the beetles exhibit a remarkable preference for this type of tree (unpublished report). It is therefore reasonable to assume that the stands with a larger number of high-risk trees should invite beetle attacks to a greater degree than those with fewer high-risk trees.

The two hazard indices might be said to complement each other. One gave a fairly good indication of the beetle hazard in a stand immediately preceding the inventory, the other for the period immediately following it. Both were products of environment, and both apparently responded directly to the differences which occurred in the environment from one stand to another.

Field Measurements

Nearly 1,900 miles of line strips were used to obtain the basic field measurements. The strips were one chain (66 feet) wide and were run through pine timber type in units of 1 mile. They usually began at known section corners and followed established land-subdivision lines as a check on their location and length. By this method it was possible to obtain a 0.6-percent sample of the 2.5 million acres of pine type within the time limits allowed for the study.

No attempt was made to obtain a uniform or methodical spacing of strips, because much time would have been lost carrying them across the numerous openings and other nonproductive territory common to parts of the area. A selected strip-sampling system was used instead, since it would, if properly executed, provide a larger and more applicable sample within a given time. In flat country with uniform stands the location and spacing of the strips assumed the regularity illustrated in Figure 1.

Before each strip was located, the immediate vicinity of the area to be sampled was inspected to determine the location and expanse of the pine stands, the variations in stand composition, site, and density, and to estimate the hazard ratings. An effort was then made to obtain an adequate sample of as many of these conditions as possible.

The strips were run by two-man parties, a number of which operated from temporary camp sites. Each party consisted of a compass man and an estimator, whose respective duties were the maintenance of proper strip alignment and dimensions and the measurement and recording of the field data. In dense stands the compass man aided in securing some of the measurements or extra estimators were assigned to the field parties.

Whenever possible, tree-measurement techniques were based upon those used by the U. S. Forest Service (3). Measurements were taken to

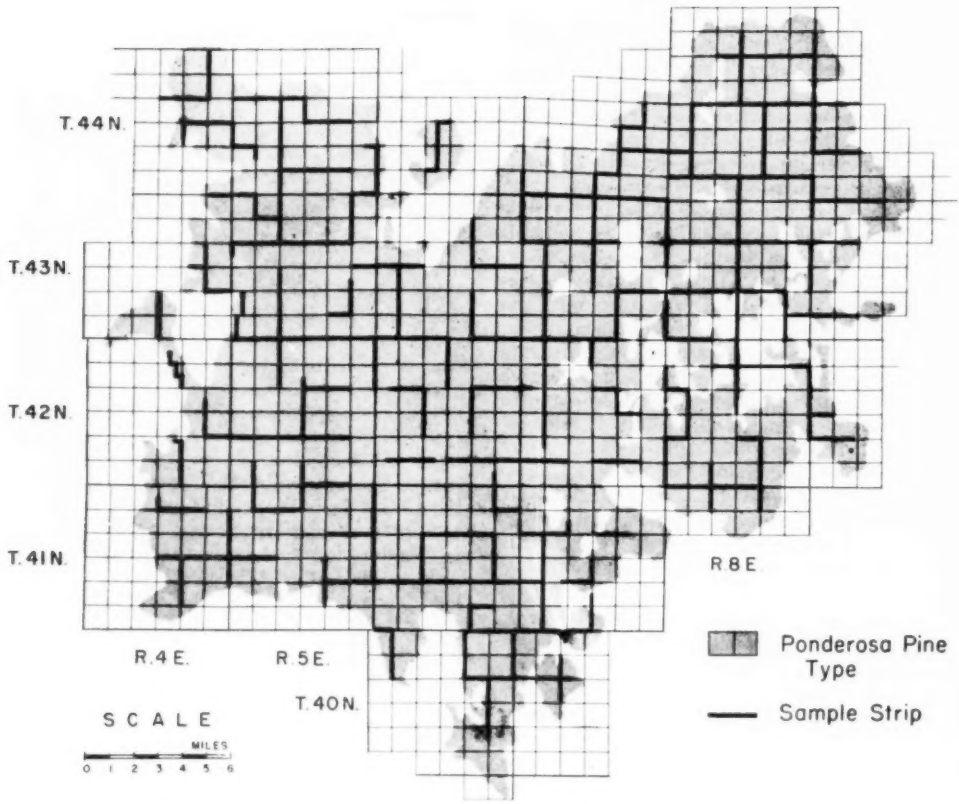

FIG. 1.—Distribution of sample strips in the Happy Camp Lava Beds Area, Modoc County, California.

obtain the total green-stand volume in board feet for all tree species. Measurements were also taken to determine the volume of all sound standing and fallen beetle-killed trees, and of high-risk ponderosa and Jeffrey pine trees. Subsequent study showed that, for conditions found in northeastern California, the timber mortality thus measured roughly approximated that of a 15-year period prior to the inventory. This information furnished the cumulative record of pine mortality required by the inventory. These records tended to eliminate bias due to year-to-year fluctuations which occurred in the past infestations.

Each green ponderosa and Jeffrey pine on the sample strips, 12 inches d.b.h. or more, was tallied according to three separate classifications —risk (*7*), Keen susceptibility (*4*) and Dunning tree class (*2*).

Additional information was obtained through the cooperation of numerous private timber operators, county officials, and the U. S. Forest Service. This information included the location and extent of various pine-timber types and cutover lands, land ownership, base maps, and such timber estimates as were available.

Determining the Hazard Ratings

The first step in determining the hazard rating of an area was to fix the rating (Table 1) of each sample strip in that area. This rating was achieved by calculating the percentage volume (1) of the pine stand found in standing and down sound snags, and (2) of the current pine stand contained in high-risk trees. Frequently the two percentages paralleled each other, and often they were identical. In but few cases were they widely divergent.

The average of the two percentages was then computed for each strip, and the resultant figure was termed the "index number" of the strip. The index numbers of most strips ranged a few reaching to 50 and above. Each strip was then classified according to one of five degrees of beetle hazard, according to the following arbitrary stratification:

Index number	Beetle hazard class
0 to 4	I—Very low
5 to 9	II—Low
10 to 17	III—Moderate
18 to 26	IV—High
27 and over	V—Very high

Strips of similar hazard were blocked out on a forest-type map, and the areas sampled by each strip outlined.

Relation of Beetle Hazard to Some Pine-Stand Characters

The ponderosa pine forests in northeastern California appear to be nearly uniform in their make-up, but close examination reveals innumerable combinations of composition, density, age, site, exposure, and elevation. In 1936, prior to the inventory, studies were made to determine whether beetle hazard was correlated with any of these stand characters. A definite relationship to one or two characters was indicated at that time, but the characters were too difficult to measure under average field conditions to use then as indices of hazard. Since then, further studies have been made (unpublished report), and it may yet be proved that certain characters, under some conditions, may be used to obtain reliable appraisals of hazard.

The relationship between beetle hazard and some stand characters was more clearly seen when the inventory was completed and the field measurements had been analyzed. Some of these measurements are shown in Table 2. Despite the trends indicated, the stand characters, with the exception of "percent of stand" in the last two items in Table 2, lacked the significance needed to justify their use as direct indices of hazard.

A visual representation of the differences in the average pine stand to be found in the five hazard classes is given in Figure 2. Here the differences in the over-all stand volume, the depletion caused by past beetle infestations, and the amount of current high-risk timber are clearly evident.

Use of the Hazard Classification in Planning Beetle-Control Work

The forest insect hazard inventory (*6*) furnished a revealing picture of beetle-hazard conditions in every part of the area studied. The hazard classification of each pine stand was shown by colored symbols on type maps reproduced to a scale of ¼ inch to the mile. These maps also showed the boundaries of the 88 infestation units established by the inventory—area subdivisions of about 30,000 acres each used in planning and administering control projects. By using these units, uniform control practices may be recommended irrespective of the treat-

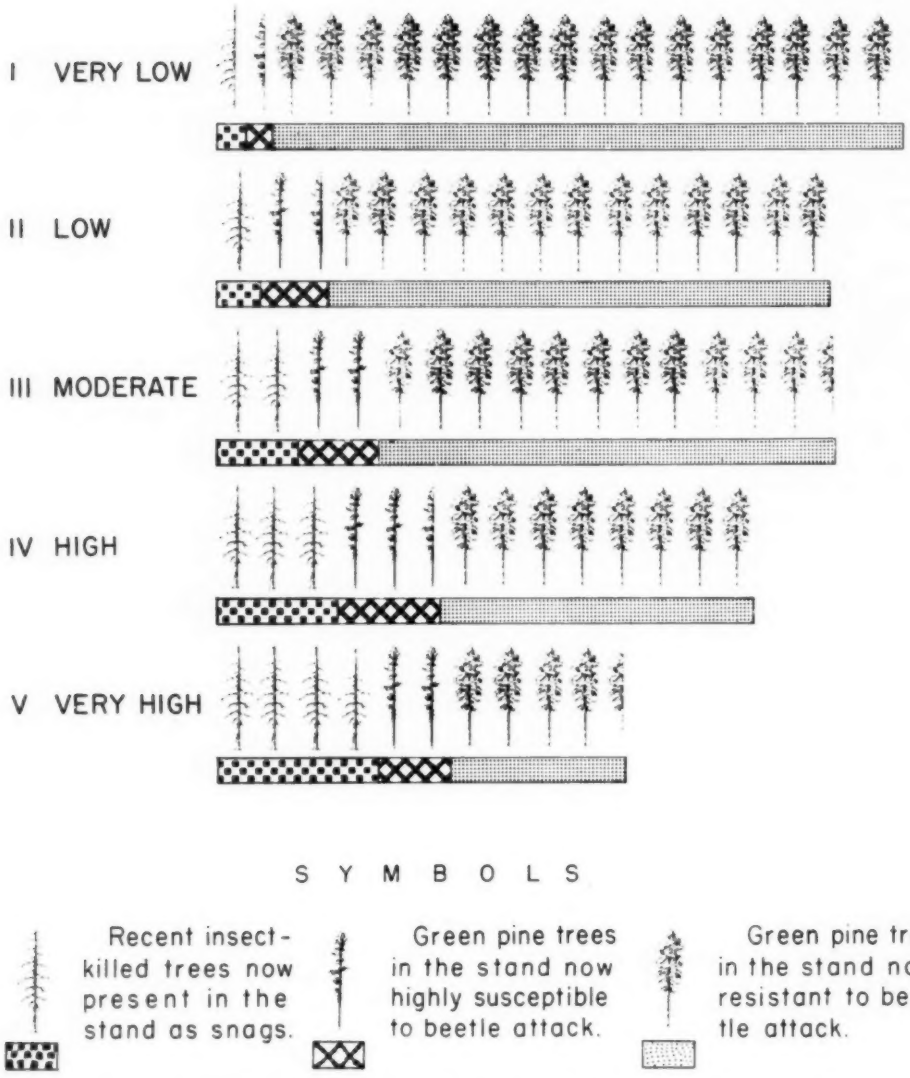
I VERY LOW
II LOW
III MODERATE
IV HIGH
V VERY HIGH
S Y M B O L S
Recent insect-killed trees now present in the stand as snags.
Green pine trees in the stand now highly susceptible to beetle attack.
Green pine trees in the stand now resistant to beetle attack.

FIG. 2.—A comparison of representative pine stands classified according to pine beetle hazard. Each row of trees symbolizes the pine stand on an average acre in each of the five zones of hazard used in the inventory. Each tree or stem represents 1,000 board feet, or approximately one tree.

ment prescribed for adjacent units. In some instances differences in hazard within the unit may also require individual treatment. In mountainous country some more or less natural obstacles to insect flight, such as high ridges, were used for unit boundaries, whereas in level country timber margins and boundaries of hazard areas or zones were used.

Accompanying the maps were statistics describing certain stand and infestation characteristics helpful in determining the control needs of each unit. The following information was given for ponderosa and Jeffrey pine:

1. *Total stand,* by species, number of trees, and board-foot volume.

2. *Past losses from beetle-killed timber,* cumulative for 15 years, by number of trees, board-foot volume, and percent of stand.

3. *Proportion of present green stand occurring as high-risk trees,* by number of trees, board-foot volume, and percent of stand.

These statistics give the clue to the control treatment needed for stands classified by each of the five hazard ratings. They also indicate the current volume of green high-risk timber to be cut to bug-proof the average pine stand. From these statistics the number of men, the amount and type of equipment needed, and the net cost or returns of each operation can be determined fairly readily. Where facilities for carrying on this work are limited, it is possible to weigh the needs of each area so that the most critical areas can be treated first. The recommended control treatment to protect mature reserve pine stands in northeastern California for an average 15-year period is as follows:

Beetle hazard class and rating	Control treatment
I—Very low	None
II—Low	*Direct control* (cut-peel-burn) only as needed; probably only once during period.
III—Moderate	*Indirect control* (sanitation-salvage) now as a hazard-reduction measure. High-risk volume to be removed will average 13 percent of stand. *Direct control* may be used in better site stands as required to maintain protection effected by indirect control.
IV—High	*Indirect control* now. High-risk volume to be removed will average 22 percent of stand.
V—Very high	*Utilization cutting* now, removing up to 85 percent of stand and leaving only low-risk trees of smaller diameters in cut-over reserve stand.

TABLE 2.—A comparison of some ponderosa and Jeffery pine stand characters and beetle-hazard ratings in northeastern California (average per acre)

Stand characters	Beetle hazard ratings				
	I Very Low	II Low	III Moderate	IV High	V Very high
Volume of stand, pine (bd. ft.)	16,606	14,916	13,056	10,344	6,248
Stand density, all spp. (Number of stems)	23.9[1]	27.5	22.6	19.0	13.4
Volume of average green pine tree (bd. ft.)	1,287	1,213	876	739	529
Proportion of total stand occurring as ponderosa or Jeffrey pine species (percent)	80.6[1]	49.5	70.7	86.7	92.5
Past[2] cumulative beetle-caused stand mortality, pine (bd. ft.)	453	1,188	1,940	2,879	4,143
(percent of stand)	2.7	7.5	12.9	21.8	39.9
Proportion of present pine stand occurring as high-risk trees (bd. ft.)	283	1,190	1,692	2,260	1,802
(percent of stand)	1.7	8.0	13.0	21.8	28.8

[1] Probably a sampling error; based upon one strip only.
[2] 12 to 15-year period preceding inventory.

The accuracy of the hazard ratings described is expected to be greatest immediately following their derivation. This accuracy may gradually diminish during the subsequent 15-year period for which the ratings are believed to be effective, because one of the indices of hazard classification—present high-risk trees—is suspected of being somewhat transitory and dependent on current environmental factors. A period of favorable growing conditions, for instance, may so improve the over-all vigor of the stand that some of today's high-risk trees could become low-risk, and even the remaining high-risk trees would probably be less susceptible to insect attack.

If this should happen, it is conceivable that losses from insects on a hazard IV (high) area 10 years after the inventory would be no greater than the present losses from a hazard III (moderate) area at the time the inventory was completed. But it is believed that losses 10 years after would also be proportionately reduced on the hazard III area, and that the relative difference in hazard between the two areas would remain the same. Such extreme fluctuations are not likely to occur often during the 15-year life expectancy of the hazard classification. Those that do occur are expected to affect only the quantitative value of the hazard ratings of the stands and not the relative hazard values between stands or the location and outline of the hazard zones now established.

Although the purpose of the hazard classification is to aid in controlling current or imminent beetle infestations, it may also help the forester to circumvent heavy beetle damage in subsequent stands of mature timber. The planning of future timber crops can be concentrated on today's low-hazard areas, which normally are also more desirable from a silvicultural standpoint. In other words, these are the areas where the timber yields would probably be greatest and the damage from beetles lowest. High-hazard areas, however, should not be dismissed as sites for future timber crops. They have supported timber growth in the past and they will probably continue to do so. Adequate protection from beetles may mean more frequent control work on these areas, and the rotation may have to be shortened to avoid the accumulation of mature and over-mature trees most frequently attacked by the beetles. These suppositions are, of course, hypothetical, but the basis of the present classification, being closely allied to the relatively stable factors of site and environment, does not preclude using it in this manner.

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A Balanced Civilized Specimen of Mankind

"IF I wished to find a well-developed, intelligent, balanced civilized specimen of mankind in our times, I should have to seek him among the good farmers, among the foresters and the engineers engaged in building government dams and canals or in terracing worn-out eroded land."

—From *A Few Brass Tacks, by* LOUIS BROMFIELD.

Association of White Pine with Other Forest Tree Species and Ribes in the Southern Appalachians

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The writer is indebted to J. F. Martin, of the same bureau; F. X. Schumacher, Duke University; F. H. Arnold, U. S. National Park Service; and G. M. Jemison and M. A. Mattoon, U. S. Forest Service.

White pine is an important associate of the second-growth hardwood forest of the southern Appalachian Mountains. During the past fourteen years fire and blister rust disease control have greatly aided the reestablishment of white pine. With proper forest management this species should become one of the most valued forest trees of the Southern Appalachian hardwood region.

WORK ON control of white pine blister rust (*Cronartium ribicola* Fischer) in the Southern Appalachian Region covers a vast area of mixed hardwood growth, of which eastern white pine (*Pinus strobus* L.) is gradually becoming an important component. During the last 14 years fire and blister rust control on Federal, State, and private lands have brought about an increase in white pine distribution. Although suppression of white pine is evident where this species has seeded in under a heavy hardwood canopy, good growth is being maintained in the more open stands.

Blister rust is now under control over extensive forest areas and is approaching this condition on the remaining areas of the region. However, before additional control work was to be undertaken along the upper slopes and drainages of the Appalachian Mountains, more definite information was needed on the distribution and association of white pine and ribes[1] within the mixed hardwood forest. The regular sheets and maps for blister rust control field data gave a good picture of white pine and ribes distribution but very little on associated tree species. To obtain this information a study was begun in 1944, which called for a critical survey of carefully selected sample areas located within representative white pine-hardwood sites over a large portion of the region.

Although this study did not answer all the questions it did indicate that white pine was maintaining its rightful place in the forest community and could be managed so as to attain full economic importance.

Methods

In this study the square-mile grid was used as the survey unit. Through each grid 16 strips were run, spaced 5 chains apart (330 feet). The strips were 1/4 chain (16.5 feet) wide and most of them 1 mile long. On the strips all important tree species were counted and recorded by three diameter (d.b.h.) classes: 0-4 inches (reproduction), 5-12 inches (pole), and 12 inches and over (thrifty immature and mature). Standing dead chestnut trees were also counted. Chestnut was included because in many localities white pine is taking over old chestnut sites, as well as being a component of the so-called white pine chestnut oak-chestnut type (4, p. 475).

Data were taken on 17 square-mile grids which were distributed throughout five states at elevations ranging from 1,200 to 4,570 feet and latitudes from 34° 37′ to 38° 44′. The location and distribution of these 17 grids are shown in Figure 1. The elevations represent the minimum and maximum at which white pine grows naturally, the optimum range falling between 1,200 and 3,500 feet. A total of 10,030 acres were covered by sampling strips aggregating 501.4 acres. No strips were run through open-pasture fields, or through timbered areas at very high elevations that were definitely non-white pine sites. This accounts for 850 acres not included in the acreage covered within the gross area of the 17 grids.

The broad timber types recognized by the U. S. Forest Service as more or less standard for the Southern Appalachians were used (5). These types are northern hardwoods, oak-chestnut, cove hardwoods, yellow pine-hardwoods, and white pine-hardwoods. On the field data sheets trees were recorded by species or groups as follows: white pine, mixed oaks, mixed hardwoods (other than oaks) yellow pines, hemlock, and chestnut (dead and dying trees and sprout clumps). Certain classes, such as oaks, other hardwoods, and yellow pines, were grouped together because of the difficulty and expense of recording each species separately. Separate counts were taken for white pine, hemlock, and chestnut. Ribes

[1]The term "ribes" is used throughout this paper to indicate both currant and gooseberry plants.

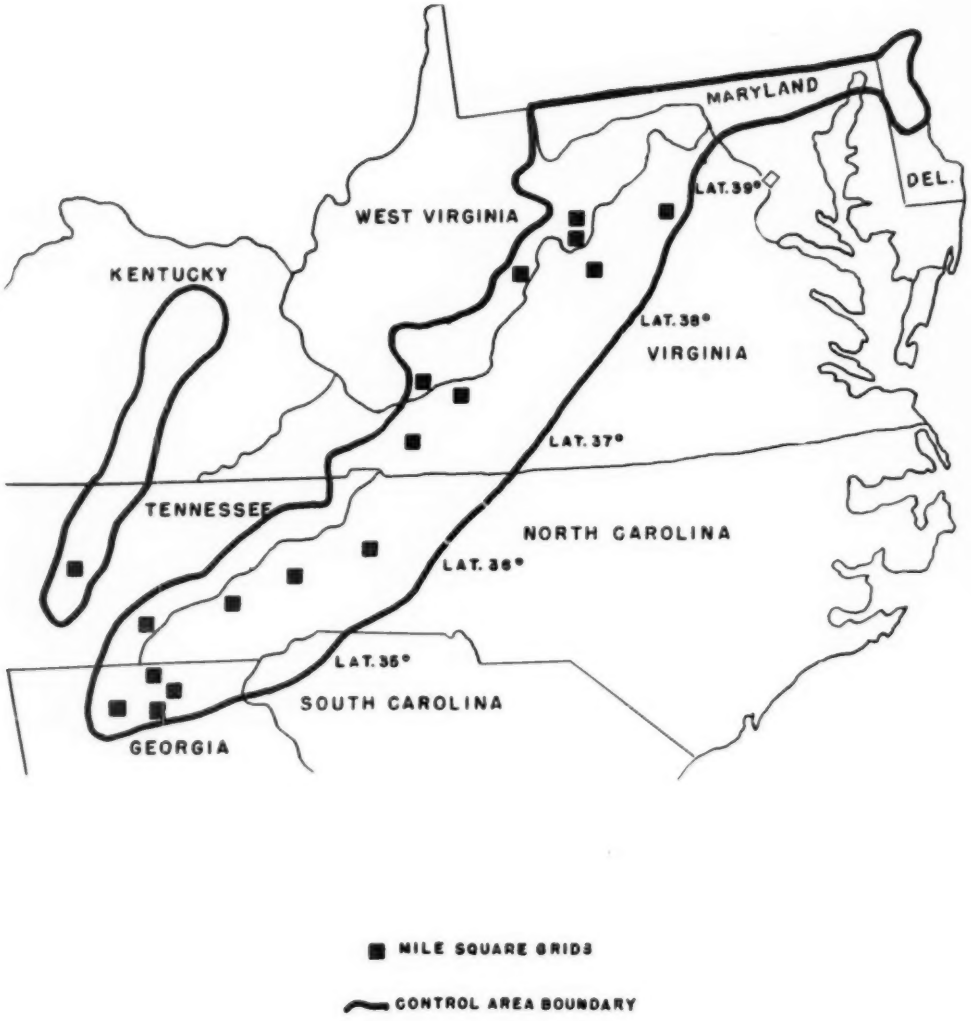

FIG. 1.—Location of sample timber type mile square grids in region.

were recorded by the number of bushes and feet of live stem encountered on the strip.

Association of White Pine with Other Tree Species

We found that white pine ranked second in percentage of all trees of a species which were in the reproduction class. In percentage of all species or groups falling in each diameter class, white pine falls below the mixed oaks and mixed hardwood groups but holds its own with the yellow pines except in the pole class. The same situation generally holds true for the average number of trees per acre in each diameter class (Fig. 2).

The significant points brought out in this study, are that white pine is a prolific seeder in the southern Appalachians and that natural regeneration is successful. A potential increase in white pine throughout the region is also indicated. With adequate protection and management, survival should be high. Furthermore, white pine is more than holding its own in the pole and mature classes.

Association of White Pine and Ribes

White pine is generally found associated with ribes along the east and west slopes of the Allegheny Mountains in Virginia and West Virginia, whereas southward this association is less pronounced. Thus, in northwestern North Carolina and northeastern Tennessee south through the Great Smoky Mountains and along the Blue Ridge range into northern Georgia, ribes plants are seldom found below 3,000 to 3,500 feet. In this area the best white pine stands are at lower elevations. For this reason extensive areas of white pine are free of ribes (Fig. 3).

In western Maryland ribes plants are fairly well distributed and are found at elevations from 400 to over 2,000 feet. In the Cumberland Mountains of Kentucky and Tennessee ribes plants are only found along certain drainages or in small isolated patches. On the Blue Ridge Mountains they are abundant in the north and central sections of the Shenandoah National Park in Virginia, but become scarce to absent as one proceeds southward through the white pine belt.

Growth of White Pine

White pine grows rapidly in the southern Appalachians, attaining its maximum development in northern Georgia and adjacent portions of North Carolina, South Carolina, and Tennessee. It grows under a wide variety of conditions in association with many other tree species. There are pure stands in many sections of the region. Moist river and stream bottoms afford the best localities for growth, but there are excellent stands on slopes and ridge tops where weather and soil provide satisfactory growing conditions. Old upland chestnut sites appear to encourage the establishment of white pine as there is a marked increase in this species on such areas. Dry south and southwest exposures are least favorable to white pine, but even in such situations it often competes and holds its own with yellow pine and chestnut oak. As stated by Frothingham (*3*, p. 27), "Northern white pine is not very fastidious and shows a capacity to succeed on some of the highest slopes which are not too dry or too exposed to winds."

White pine is reestablishing itself on many sites that now support understocked stands of timber of inferior species or quality. Barrett (*1*), who conducted growth studies of white pine and associated species in northern Georgia and southwestern North Carolina, showed through statistical analysis of plot data that white pine was superior to yellow poplar and its other associates in diameter growth and "was beginning to occupy an important place in the understory over extensive areas." However, too often the white pine is also being suppressed by overtopping hardwoods, many of which are of inferior species. Where these conditions exist, the ribes should be removed and the forest canopy opened up enough to allow the white pine to grow, but sufficient shade should be retained to help suppress any new ribes growth that may develop. How much or how little shade is necessary to suppress ribes regeneration in the southern Appalachians forests is not definitely known. Observations throughout the region during the last few years show that ribes regeneration falls off rapidly as soon as the second-growth forest gets a good start. Application of forest practices that would aid ribes suppression and still benefit white pine growth should in time greatly reduce the cost of blister rust control and materially increase the yield of white pine.

Status of Blister Rust Control

Over 3,000,000 acres of white pine within the southern Appalachian control area have been found to be ribes-free or to have been initially protected from the blister rust disease by the

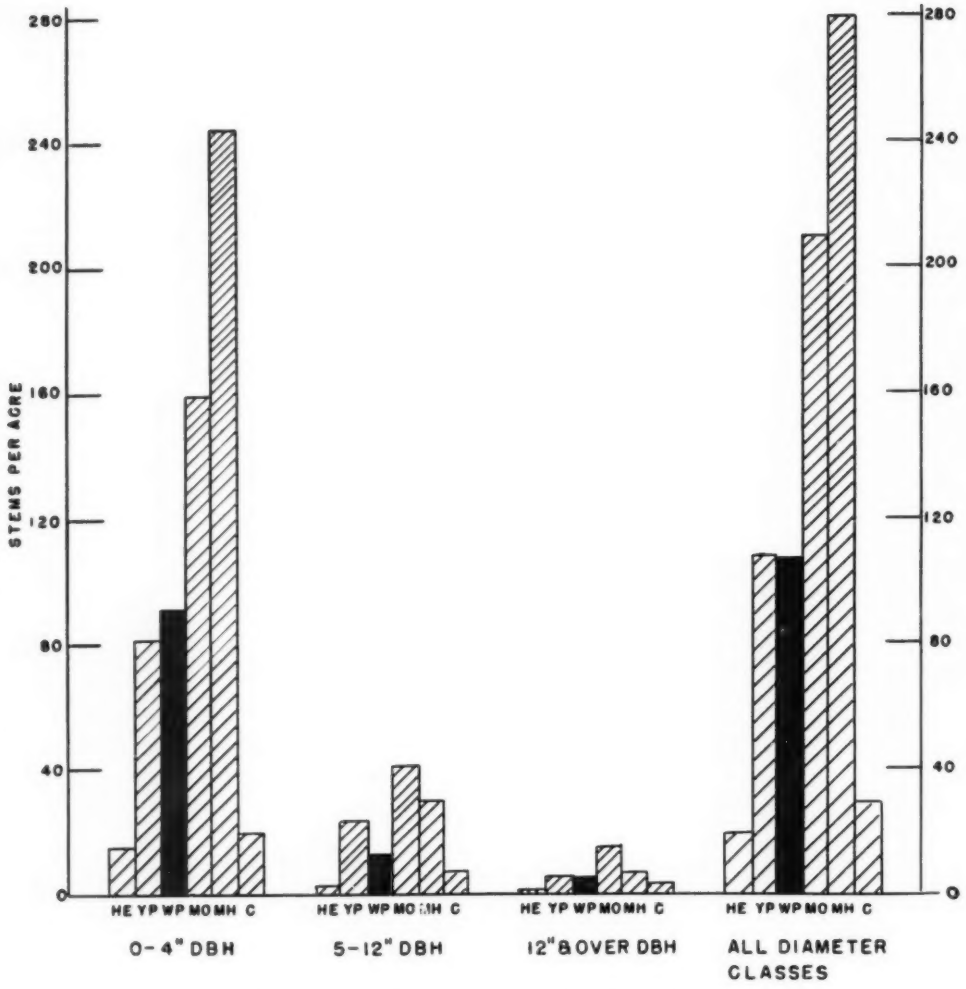

FIG. 2.—Average number of trees per acre by diameter classes.

(HE = hemlock, YP = yellow pines, WP = white pine, MO = mixed oaks, MH = mixed hardwoods, C = chestnut).

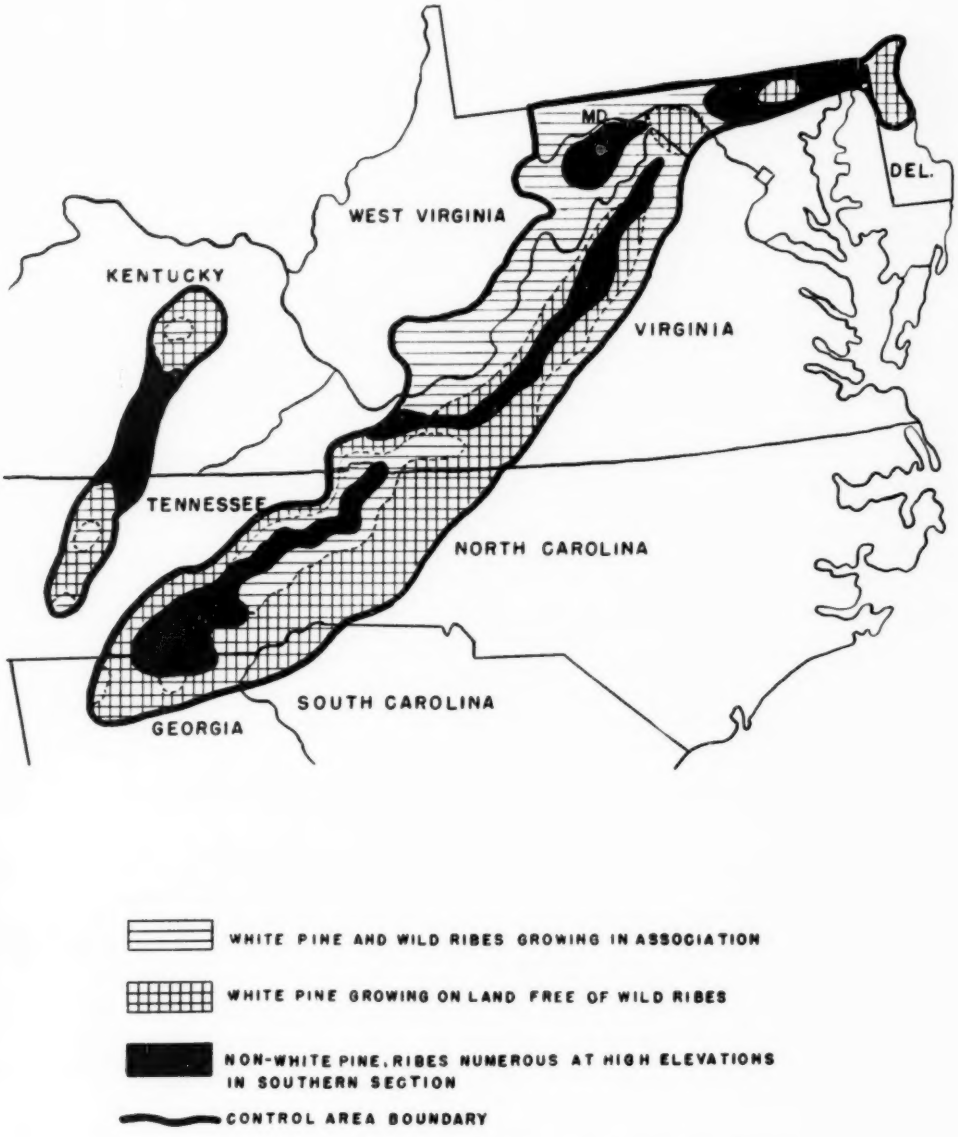

FIG. 3.—Association of white pine and wild ribes in the Southern Appalachians.

removal of ribes. Of more than 6,600,000 acres examined in the control area, 615,000 acres were found to be ribes-bearing and require crew work to remove these bushes. These ribes-bearing acres lie mostly in Maryland, Virginia, and West Virginia, with scattered areas in other parts of the region. The remaining control acreage, or 91 percent, was found to be ribes-free. Ribes eradication in this region is, therefore, a problem on about one-tenth of the total control acreage. However, the total ribes-bearing acreage will gradually increase over the years, because white pine is becoming established on sites that contained none of these trees when the first survey was made 10 to 14 years ago. Continuous fire protection, especially on national forest lands, has allowed white pine to seed on new lands, and much of this increase in its range is on the higher mountain slopes, where ribes plants are generally found. This new range has brought about some extension of the control area, and some added white pine acreage will require treatment for blister rust every few years. Before any new area is worked, however, it is examined to determine whether existing and potential prospects for white pine warrant the removal of ribes.

Timber Management as an Aid in Controlling Blister Rust

The development and application of special timber-management practices by land-managing agencies is becoming recognized more and more as an important aid in controlling disease and insect damage. Two objectives should be kept in mind in formulating policies and practices for the management of white pine to aid its survival in the mixed-hardwood forests in the southern Appalachians. First, white pine should be encouraged to reproduce and grow by proper cutting and thinning methods; and second, enough cover should be left to assist in the suppression of ribes. Under a heavy canopy of hardwood growth, where the shade is very dense, ribes plants are absent or remain suppressed and scattered.

Although the blister rust disease is destructive to white pines, the problem of control is much less difficult in the southern Appalachians than in other regions. After 14 years of ribes-removal work, control of blister rust is now approaching a point where large areas will not need a reexamination for 5 years or more. Such areas are placed on maintenance, because ribes plants are absent or the population has been so reduced through ribes removal that there is no likelihood of any serious damage from blister rust to the present stand. The length of time these areas will remain on maintenance will depend a great deal on future forestry practices. Fivaz (*2*) and others have proved that ribes seeds in the forest floor remain viable for many years and will germinate readily under proper conditions.

The control of blister rust does not stop with the removal of the ribes that can be readily found, since the small suppressed plants and viable seeds that remain in the forest floor will grow into dangerous bushes under favorable conditions. On the other hand, if too much of an overstory is left standing in order to suppress ribes, full productivity of the forest will be greatly curtailed. Therefore, blister rust control and forest-management practices should be integrated so as to give adequate protection to the young stands of white pine in the mixed hardwood forests and keep these forests fully productive.

Summary

A study on the association of white pine with other forest tree species and ribes in the mixed-hardwood forests of the southern Appalachian Mountains was begun in 1944. Data obtained in this survey show that white pine is gradually establishing itself on a wide variety of sites both at high and low elevations. The optimum range is between 1,200 and 3,500 feet. White pine reproduces readily and competes favorably with associated species, an indication of a potential increase in white pine throughout the region. Fire and blister rust control during the last 14 years have materially aided the establishment of white pine.

Wild ribes plants are most abundant at the higher elevations and comprise a rather narrow belt along the main mountain ranges of the Appalachians. This ribes belt, where ribes and white pine are found growing in association, represents approximately 615,000 acres, or one-tenth of the total blister rust control area. White pines growing along the lower slopes are usually found on areas free of ribes.

The shade from the extensive growth of young hardwoods aids materially in the suppression of ribes. However, it also suppresses young white pine growth, and ribes eradication should be supplemented with forest-management practices that not only will further the permanent sup-

pression of ribes, but will also release the white pine and bring about a more productive white pine-hardwood forest.

After 14 years of ribes-removal work, control of blister rust is now approaching a point where large areas will not need a reexamination for 5 years or more, provided that the forest floor is not unduly disturbed by logging or fire to cause excessive germination of ribes seeds stored in the duff.

Full productivity of the mixed white pine and hardwood forests will be lost unless timber-management practices are closely integrated with blister rust control.

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Abstract of Master's Thesis

A Study of Movements and Habitat Preferences of Muskrats in Maine. By Malcolm Wilford Coulter. University of Maine. 1948.

A FIELD study was made of the movements and seasonal habitat preferences of muskrats on a small marsh in Maine. The habitat was classified according to plant types and available water and marsh area. The amount of wandering that muskrats exhibited was computed by measuring the distances that tagged individuals travelled between known trap stations. Seasonal habitat preferences were determined by checking the location of animals on the study area every two weeks throughout the year. These data were recorded in relation to the habitat types.

It was found that 53 percent of the muskrats recaptured one or more times had moved over 200 feet from their original stations; shifts up to 1.6 miles were recorded. Animals located along the marsh edges and main water channels moved greater distances than did those living within the marsh at small natural pools and channels.

Breeding animals preferred areas in dense shrubby cover. During the summer of 1946, emergent vegetation was extensively used under low water conditions, but received little use in 1947 when the water level was 8 to 10 inches higher. Areas in rank emergent vegetation near water 18 to 30 inches deep were preferred during the fall and winter. Several expanses of moist marsh, lacking channels and surface water much of the year, supported very few animals.

Control of the water level and the creation of artificial pools and channels are suggested as simple measures to increase the natural productivity of the marsh for muskrats. The establishment of small local refuges is recommended to preserve ample breeding stock to help maintain a high yield of muskrats.

Statistical Aspects of Timber-Volume Sampling in the Pacific Northwest

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The size of sample and the type of sampling unit are important considerations in sampling for an estimate of timber volume. If the sample is either too large or too small; time, money, and effort may be wasted. One type of sampling unit may supply more information per dollar of expenditure than another type.

THE first inventory of the forest resources of Oregon and Washington, undertaken as part of the nation-wide forest survey, was completed in 1937. Since that time work in this region has been directed towards keeping forest-area and timber-volume statistics current against changes in forest condition resulting from growth and drain. In the original inventory the so-called compilation method was employed. This method consisted in collection and compilation of existing timber-volume data, such as commercial cruises, and adjustment of this data after field checking. All forest land was type mapped, and merchantable timber not covered by existing cruises was estimated in the field by intensive reconnaissance. The maintenance work starting in 1937 also used the compilation method, several counties being reinventoried each year.

In 1946 a change of method was considered and adopted which eliminates the major weaknesses of the compilation system and preserves most of its advantages. The technique or method now used in this region consists of correcting and revising the original type maps and determining new sawtimber and total-timber-volume estimates from measurement and analysis of trees on randomly selected sample plots. Revised area statistics are obtained from the revised type maps county by county. Aerial photos are used in revising type maps and in locating sample plots in the field. Growth and mortality data are obtained from measurements taken on the timber volume plots.

Problems that arose when this method was applied to the Pacific Northwest are undoubtedly encountered elsewhere by persons engaged in forest surveys on a large scale. The following analysis of certain aspects of the sampling problem may be of interest and profit to others concerned with similar situations.

Method

In Jackson County, Oregon, four samples of volume were taken in 1947. The first was a sample of all uncut sawtimber types, the second a sample of all selectively cut types, the third a sample of all immature types, and the fourth a sample of all deforested and nonrestocked types. This paper is concerned only with the sample of uncut sawtimber types.

For the estimate of total net sawtimber volume in uncut sawtimber types in Jackson County, two random sampling units were selected in each of 25 geographical subdivisions of the county. The gross areas of these subdivisions (sampling strata) varied considerably, but an attempt was made to obtain an approximately equal acreage of sawtimber types for each subdivision. Information from the original type map and from subsequent cutting records was used to accomplish this stratification.

The sampling units were selected on aerial photos, and volume data were taken at the ground positions corresponding to the random photo locations. Each random sampling unit (illustrated by a circle in Figure 1) consisted of five one-fifth acre circular plots at two-chain intervals in a straight line.

Results

Volumes by sampling units and by plots are listed in Table 1. The average of the 50 sampling-unit volumes was 22.84 thousand board feet, log scale. This figure represents the volume of the average acre. For the estimate of total volume, it has been multiplied by the total number of acres of uncut sawtimber types, as determined from a dot count of the new Jackson County type map. The new type map resulted from a combination of photographic interpretation and ground reconnaissance. Since the dot count was very intensive, it has been asumed that area statistics derived from the new type map are without sampling error. The sampling error (standard error) of the average volume, 22.84 thousand board feet, was found to be 1.68 thousand board feet or 7 percent of the average volume. It was based on the variation between sampling units within strata, the vari-

TABLE 1.—NET VOLUMES BY PLOTS AND BY SAMPLING UNITS, FROM THE JACKSON COUNTY SAW-TIMBER SAMPLE, THOUSANDS OF BOARD FEET

Stratum	Sampling unit no.	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Sampling unit total
1	2	2.82	5.55	7.65	11.20	1.89	29.11
	2	9.50	0	0	0	0	9.50
2	3	.86	.67	4.19	1.73	1.66	9.11
	4	4.84	8.15	4.88	1.04	1.54	20.45
3	5	.53	3.28	7.60	4.30	1.69	17.40
	6	7.04	1.26	.90	4.55	2.63	16.38
4	7	4.94	1.02	6.91	9.08	.62	22.57
	8	8.50	4.81	8.48	3.99	2.38	28.16
5	9	3.97	4.35	.83	2.55	6.49	18.19
	10	.15	8.65	.44	0	9.78	19.02
6	11	2.43	5.69	4.00	4.59	2.95	19.66
	12	1.49	.22	2.08	3.13	2.03	8.95
7	13	3.83	3.82	0	0	.42	8.07
	14	9.30	2.65	1.10	4.06	7.87	24.98
8	15	3.47	3.20	6.33	6.45	.47	19.92
	16	2.14	.76	1.43	7.24	10.16	21.73
9	17	9.53	3.28	30.20	13.69	18.65	75.35
	18	3.17	11.40	.88	12.24	13.28	40.97
10	19	2.36	2.65	3.54	0	5.28	13.83
	20	.38	9.71	15.09	0	6.66	31.84
11	21	2.29	3.58	1.63	.79	0	8.29
	22	4.38	11.86	9.97	5.47	2.12	33.80
12	23	4.60	5.14	4.78	3.71	5.58	23.81
	24	1.17	1.99	3.60	3.97	1.29	12.02
13	25	5.81	4.43	5.76	9.46	11.86	37.32
	26	8.12	3.77	4.40	4.17	9.68	30.14
14	27	2.22	.79	1.70	6.80	1.20	12.71
	28	2.16	3.07	1.91	.18	.50	7.82
15	29	1.63	5.41	1.87	5.97	8.99	23.87
	30	14.03	9.70	12.36	7.31	11.46	54.86
16	31	2.02	7.38	.15	9.43	2.89	21.87
	32	5.16	6.52	4.19	6.72	2.28	24.87
17	33	2.30	3.61	3.64	.83	0	10.38
	34	1.81	6.92	.78	.50	.29	10.30
18	35	1.53	2.62	1.48	.41	1.04	7.08
	36	.74	.95	.79	0	0	2.48
19	37	.26	.37	1.22	4.29	.71	6.85
	38	6.84	3.44	5.08	3.65	.25	19.26
20	39	6.77	2.56	.40	1.48	3.91	15.12
	40	11.86	.82	1.62	11.04	6.34	31.68
21	41	5.97	0	8.88	5.43	.65	20.93
	42	4.63	8.77	14.99	11.96	1.51	41.86
22	43	3.01	5.35	1.69	0	1.30	11.35
	44	6.40	0	13.61	5.69	5.12	30.82
23	45	16.41	5.04	9.75	17.53	5.08	53.81
	46	4.20	6.67	3.75	1.72	2.59	18.93
24	47	.15	6.17	4.84	5.71	2.49	19.36
	48	7.45	10.16	5.07	2.25	9.38	34.31
25	49	9.87	6.14	5.52	4.30	6.93	32.76
	50	5.54	6.82	5.18	.07	10.42	28.03

ation among strata having been removed through an analysis of variance (Table 2).

There are about 760,000 acres of uncut sawtimber types in Jackson County, and, according to the national standard of accuracy established by the Forest Survey for areas of this size, a standard error of 11 percent would have been satisfactory. On the basis of the withinstratum variation encountered in Jackson County, a sample consisting of 22 sampling units would have been sufficient to meet, but not exceed, the standard of accuracy.

Optimum Type of Sampling Unit

Using the data from Table 1 it is possible to determine what the results would have been if, instead of taking five plots in the manner described, only the first plot, or the second, or the first two, or the first and fourth, or any other possible number and combination of plots had been taken.

For the type of sampling unit consisting of two plots at a six-chain interval, there are two possible sampling units obtainable from the data of Table 1. The first and the fourth would result in one such unit and the second and fifth plots would result in the other. In this instance, the 50 sampling units gave two estimates of popular variance, one for each of the two possible sampling units. For some of the other types of sampling units more sampling units were possible, and for each sampling unit an estimate of variance was calculated. The averages of the variances for various types of sampling units were made comparable and then used to determine the number of sampling units required for a given accuracy (Table 3).

Table 3 indicates that one sampling unit, consisting of all five plots, is capable of supplying the same amount of information as 2.27 samp-

TABLE 2.—ANALYSIS OF VARIANCE

Source of variation	Degrees of freedom	Mean square
Total	49	194
Among strata	24	249
Within strata	25	140

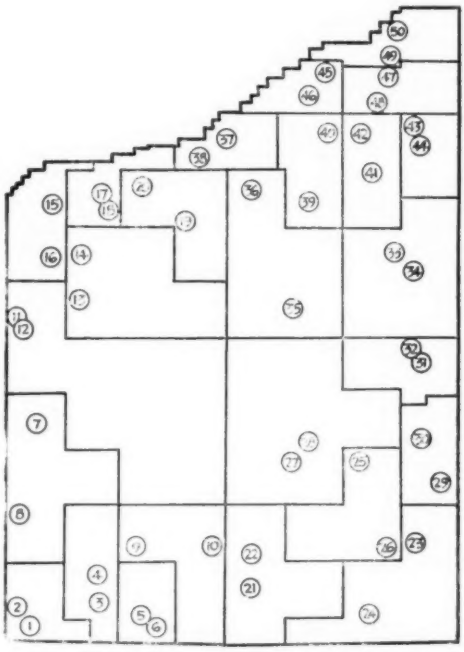

FIG. 1.—Sawtimber sampling strata and approximate positions of sampling units in Jackson County, Ore.

TABLE 3.—NUMBER OF SAMPLING UNITS REQUIRED FOR A GIVEN ACCURACY

Sampling unit					
Number of plots	Spacing in chains	Symbol	Average[1] comparable variance	Relative total area in sample for a given accuracy	Relative number of sampling units for a given accuracy
5	2	00000	7.75	2.20	1.00
4	2	0000	8.36	1.90	1.08
3	2	000	10.06	1.71	1.30
2	2	00	11.50	1.31	1.48
1		0	17.60	1.00	2.27
2	4	0 0	12.43	1.41	1.60
2	6	0 0	10.18	1.16	1.31
2	8	0 0	10.79	1.23	1.39

[1]These average comparable variances are based on total variation among the 50 sampling units rather than the variation between sampling units within strata.

ling units consisting of a single plot. Similarly, 100 sampling units, consisting of all 5 plots, are as good as 130 sampling units consiting of three plots at two-chain intervals.

Field experience has indicated that the first two sampling units listed in Table 3 will involve an excessive amount of time and work. Some of the random locations were as far as 14 miles from the nearest road, and the route to them often crossed difficult topography. These sampling units, and even more-accessible sampling units, resulted in work days of from 14 to 16 hours. It has been decided, therefore, to adopt a sampling unit consisting of fewer plots for future work.

If dependable data from a time study were available, it might be possible to introduce a cost factor into the calculations leading to Table 3. This would tend to increase the efficiencies of the smaller and more compact sampling units. The cost factor would be difficult to determine, however, since an average of one sampling unit per day would probably be the best that could be expected regardless of the type of sampling unit. The time saved in taking smaller and more compact sampling units would be used for type mapping, and it would be difficult to assign a value-per-hour figure to the mapping phase of the work separate from the volume-plot phase.

Since the average variances of the various types of sampling units are subject to sampling error, the relative numbers of units for a given accuracy in Table 3 are also subject to sampling error. This may explain the fact that fewer sampling units are indicated for the type of sampling unit consisting of two plots at an interval of 6 chains than for the type of sampling unit consisting of two plots at an interval of 8 chains.

Abstract of Master's Thesis

The Bobwhite Quail; Its Population Density in Relation to Food and Vegetative Cover; Also Its Management; in Warren County, Iowa. By Homer I. Brent. Louisiana State University. 1948.

THE purposes of this study were: (1) to determine the quail population density in relation to food, vegetative cover, and its management in Warren County, Iowa, (2) to develop or give one a better understanding of the problems and factors that confront man in raising the carrying capacity of his land, and (3) to show ways that he can raise or increase the quail population.

Conclusions from this study show that the most practical quail management is accomplished through good land use. This study does not attempt to explain in detail how to apply such practices. It does, however, describe practices now being adapted by farmers in Warren County; indicating how the practices fit into wise land use, and what these practices mean to wildlife in general.

In developing this study the questionnaire method of survey was used, and my own observations, as well as correspondence with various state and county game supervisors, all leaders in the field of wildlife conservation.

This study disclosed that the bob-white thrives best in agricultural communities; thus there is a definite need for better land use practices to lessen soil erosion and to improve the quality and distribution of food and cover.

Agricultural practices that serve to evict the quail populations can also serve to evict man as well. Wildlife flourishes when man and land are in harmony with one another.

Growth After Cutting in an Even-Aged Mature Ponderosa Pine Stand

Hermann Krauch

Silviculturist, Southwestern Forest and Ranger Experiment Station, maintained by the Forest Service, U.S. Department of Agriculture, for the states of Arizona, New Mexico, and West Texas, with headquarters at Tucson, Arizona.

How well ponderosa pine stands of the Southwest respond after partial cutting is set forth in this study on the Coconino National Forest.

WHILE virgin ponderosa pine stands in the Southwest are typically uneven aged, sizable tracts are sometimes encountered where the stand is entirely made up of mature trees, with little or no immature sawtimber, poles, or advance reproduction. In marking such stands for cutting, the forester is faced with two major alternatives:

1. Cut heavily and leave only enough mature trees for seed.
2. Cut lightly and retain a high proportion of the mature trees for further growth.

An 8-acre sample plot established in 1926 on the Coconino National Forest gives a concrete example of what may be expected if the second method is applied. Since the reserve stand on the sample plot consisted almost entirely of mature trees, the 20-year record also provides the first measure of the increment of this age class on an area basis.

Character of Stand

Conditions favorable for the growth of ponderosa pine are here among the best that prevail on the Colorado Plateau, largely because of the loose and well-drained limestone soil. The original volume per acre on this plot was about 21,500 board feet. Of this, 14,331 board feet, or about 67.6 percent, was cut, leaving a reserve volume of 7,169 board feet per acre. The excellent quality of the site is indicated by the heights of the reserved matured trees, several of which run well over 100 feet, with a maximum of 120 feet. Figure 1 shows the distribution of trees by 2-inch diameter classes, before and after cutting. The accompanying table shows the distribution by broader diameter classes. Because the trees occurred largely in groups, cutting of the stand resulted in considerable release of trees that were left. (See Fig. 2.) Most of the reserved trees are thrifty, although a few have somewhat sparse crowns. A few are distinctly unthrifty and should have been cut.

Diameter and Volume Growth Per Tree

Table 1 shows the mean annual diameter growth and the mean annual board-foot volume growth of the trees comprising four different diameter groups. As will be noted, both the greatest diameter and volume growth was made by trees in the 21-25 inch group. Although trees in the 12-20 inch group grew only slightly less in diameter, the volume growth per tree was only half as great. While the trees in the 26-30 inch group grew considerably less in diameter than did those in the 12-20 inch group, the volume growth per tree was 1.82 times greater. While trees in the 31-34 inch group grew .055 inch less per annum than those in the 12-20 inch group, the volume growth per tree was 4.5 board feet or 62 percent greater. The significant fact shown by these results is that mature ponderosa pise trees, even though they are of large diameter, will make substantial growth after being released.

Increment

Table 2 shows the mean annual gross and mean annual net board-foot increment per acre, based on trees 12 inches d.b.h. and over and trees 21 inches d.b.h. and over. The table also shows how much of the increment is contributed by "new" trees (ingrowth) and how much by "original" trees, the latter being the trees that were of and above the indicated diameter at the time of plot establishment. It will be noted that for trees 12 inches d.b.h. and over the increment contributed by new trees has been very small. The reason for this is that there were not sufficient numbers of trees below 12 inches d.b.h. at the time of plot establishment to provide for any appreciable board-foot volume in 20 years. On the other hand, for trees 21 inches d.b.h. and over, the contribution of new trees to increment is considerable, amounting to 37 board feet or a little over 33 percent of the total gross increment and almost 47 percent of the total net increment. The results in table 2 indicate the need of distinguishing between increment representing the *growth* of trees and increment that represents the prorated volume of trees attaining merchantable size during a

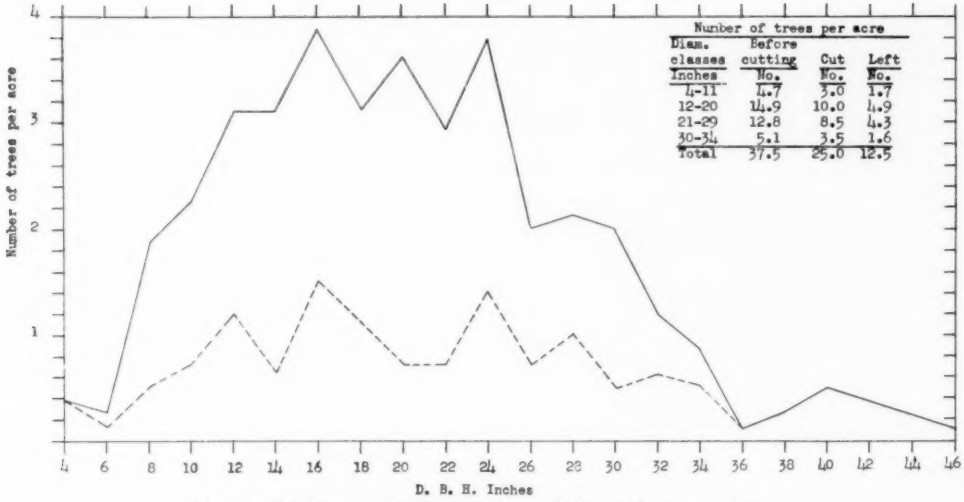

FIG. 1.—Number and distribution of trees before and after cutting.

NOTE: The vertical distances between the solid and broken lines represent number of trees cut.

Legend: ——————————Before cutting. ..... After cutting.

FIG. 2.—Appearance of the reserve stand one year after area had been logged. Note the scarcity of pole growth and complete absence of advance reproduction. Coconino National Forest, Arizona.

given period. Thus, in table 2, for trees 12 inches d.b.h. and over, the increment is almost entirely represented by growth, whereas for trees 21 inches d.b.h. and over it is not. However, in either case the total increment is the same.

Since the results shown in table 2 do not clearly reveal the yield capacity of stands comprised solely of mature trees, attention is called to the results shown in Table 3. The data in the table are based on three adjacent 1-acre units, within the 8-acre plot. All of the trees on these 1-acre units are mature. No mortality occurred on any of these units during the entire 20-year period elapsing since cutting. The increment per acre, therefore, corresponds with gross increment shown in Table 1.

TABLE 1.—DIAMETER AND VOLUME GROWTH PER TREE[1]

Diam. classes	Ave. diam.	Ave. vol. per tree	Mean annual growth per tree[2]		Number of trees
			Diameter	Volume	
	Inches	Ft. b.m.	Inches	Ft. b.m.	
12-20	16.0	175	0.172	7.2	39
21-25	23.6	693	0.176	14.8	19
26-30	27.9	1,159	0.149	13.1	14
31-34	32.8	1,655	0.117	11.7	10
12 and over	22.7	643	0.161	10.5	82
21 and over	27.4	1,068	0.150	13.6	43

[1] Includes only trees above 11.6 inches d.b.h. and also only those that were alive at time of last measurement, made in 1946.

[2] As based on 20-year record, 1926-46.

The results shown in Table 3 clearly demonstrate the potentialities of a growing stock consisting of mature trees. Whereas on unit 3 the increment per tree is greater than that of the trees on both units 1 and 2, the increment per acre is less. Unit 3, however, has only 8 trees per acre, whereas units 1 and 2 both have 12. Assuming that unit 3 could carry 10 trees per acre instead of 8—which presumably it could—the annual increment per acre would be 141 board feet, which compares favorably with that of the other two units. The considerably greater per-acre increment obtaining for these three 1-acre units than for the gross increment on the entire plot is attributed primarily to a lower proportion of unoccupied area and also to a better spacing of the trees.

Application of Findings to Forestry Practice

The results of this study indicate that thrifty, mature trees can be expected to contribute substantially to the increment of ponderosa pine cut-over stands. The retention of such trees for further growth would seem to be justified where there are no younger trees occupying the same area, or where there are some younger trees but not enough to keep the land in a fully productive condition. Retention of mature trees will permit cuttings to be made at shorter intervals than when most of such trees are cut. Although the retention of more mature trees than are needed for seed could be avoided by using long cutting cycles, it is doubtful whether the yield would be as great as when a number of thrifty mature trees are retained and cuttings made at short intervals.

Objection to the retention of large mature

TABLE 2.—Reserve stand and mean annual increment per acre

Reserve stand				Mean annual increment per acre[1]					
				Gross[2]			Net		
Trees per acre	Ave. diam. per tree	Ave. vol. per tree	Volume per acre	Orig. trees	New trees	Total	Orig. trees	New trees	Total
No.	*In.*	*Ft. b.m.*	*Ft. b.m.*	*Ft. b.m.*	*Ft. b.m.*	*Ft. b.m.*	*Ft. b.m.*	*Ft. b.m.*	*Ft. b.m.*
Trees 12 inches d.b.h. and over									
10.8	23.0	666	7,169	110	2	112	79	2	81
Trees 21 inches d.b.h. and over									
5.9	27.4	1,073	6,318	75	37	112	44	37	81

[1] Based on 20-year period, 1926-46.

[2] Increment before deducting for mortality which was at the rate of 31 board feet per annum.

trees is frequently made because of their high mortality risk. While it is true that such a risk is involved, it would seem better to assume this risk rather than to cut the trees and allow the area formerly occupied by them to remain idle pending restocking to new seedlings—which frequently does not occur until after a long period of years. Furthermore, because of both the relatively high volume content and quality of lumber in large mature trees, it is likely that whenever such trees died it would not only be possible but also profitable to salvage them, especially where the lands lend themselves to truck logging.

TABLE 3.—RESERVE STAND AND MEAN ANNUAL INCREMENT ON THREE DIFFERENT 1-ACRE UNITS WITHIN THE 8-ACRE PLOT

Unit No.	Trees per acre	Ave. diam. per tree	Range	Ave. vol. per tree	Vol. per acre	Mean annual increment	
						Per tree	Per acre
	No.	*Inches*	*Inches*	*Ft. b.m.*	*Ft. b.m.*		
1	12	20.8	13-33	548	6,579	11.0	132
2	12	23.8	13-32	627	7,520	12.4	149
3	8	29.8	27-34	1,388	11,103	14.1	113
Ave.	10.7	24.2	13-34	819	8,400	12.3	131

Abstract of Master's Thesis

A Winter Habitat Study of Deer in Maine. By Leslie Lloyd Glasgow. University of Maine. 1948.

AN INVESTIGATION was made of weather conditions in a deer yard near Chesterville, Maine, during the winters of 1946-1947 and 1947-1948. Snow depths were taken during scheduled visits to the yard throughout both winters. Since both seasons were rather mild, deer suffered very little from deep snows and low temperatures.

A survey of browse conditions in 22 yards was made in western and southern Maine. The method used was one which was developed by Shaler E. Aldous for deer yards of the Lake States. A percentage sample of the occurrence of browse and its degree of utilization were taken using 1/100 acre plots located at predetermined intervals throughout the yard. Field data were transferred to yard analysis sheets and the arithmetical computations necessary for a critical analysis were completed. It was found that food conditions in 36.3 percent of the yards were good, 36.3 percent fair and 27.4 percent poor. The most important browse species were northern white-cedar, balsam fir, red maple, mountain maple, striped maple, hoary alder, witherod, mountain holly, sugar maple, raspberry, yew, ground juniper, hemlock, and winterberry.

Local Genetic Variation in Silver Maple[1]

Jonathan W. Wright

Geneticist, Northeastern Forest Experiment Station, Upper Darby, Pa.

An experiment with silver maple in Indiana indicates that there are pronounced genetic differences between wild trees growing in a limited geographic area. Such differences indicate the possibility of obtaining more productive timber types through the selection of seed trees.

OPEN-POLLINATED seed was collected in the spring of 1942 from nine wild silver maple (*Acer saccharinum* L.) trees in four localities (Table 1) in Indiana to test for genetic variation within the species. The parents were selected at random in each locality. Within each locality the parents were located within one-fourth mile of each other. Trees from the same locality were from the same or adjoining "neighborhoods" or "random breeding units"[2] in a linearly continuous population. The localities were within 35 to 120 miles of each other; those at Lafayette were the northernmost and farthest removed.

The seeds were sown broadcast in open seedbeds in early May. In mid-June the seedlings were transplanted. A randomized block planting of four blocks of nine rows of 16 seedlings each was made; progeny of each parent were represented by one row in each block. The trees were set out on a 1-foot by 1-foot spacing. The planting was made on an unfertilized Warsaw gravelly clay of moderate fertility, and was cultivated.

The original plan was to carry the plots for 3 years. However, by the end of the second growing season the progenies averaged 5.4 to 6.3 feet tall, and were crowding each other slightly. It was felt that competition during the third growing season would be too severe to allow the trees sufficient room for expressing their inherent character. Hence measurements were made at the end of the second growing season. The following measurements were made on each seedling: 1942 height, 1943 height, height growth during 1943, 1943 diameter, length of stem killed back during the winter of 1942-43, and the number of branches on the current year's growth. At the time of the measurements there was no evidence of disease or insect attack on the seedlings, nor were there any obvious differences in characters not measured.

Analyses of variance indicated no significant differences in height or diameter growth among the progenies.

But there were significant differences among progenies in the amount of winter killing. The average length of stem killed back during the winter of 1942-43 varied from 12.4 to 18.6 centimeters for the progenies from the warmer southern counties and from 4.4 to 13.4 centimeters for the progenies from Tippecanoe County (Table 1). The range of the progeny means was 14.2 centimeters, almost twice the least significant difference at the 5 percent point (7.5 centimeters). Since the Lafayette progenies suffered some winter killing, it is clear that they are not perfectly adapted to their environment; but they are relatively more winter hardy in their native habitat than are the progenies from the southern counties.

This winter killing as observed is a juvenile character, related to the inability of the shoots to stop growth and to harden off in the fall. It is found in many species of hardwoods. As the trees become older they form good winter buds and harden off in time to escape winter injury. Thus the differential winter killing observed is not an indicator of *absolute* mature winter hardiness, but is probably an indicator of *relative* mature winter hardiness.

Branchiness was determined by counting the number of branchlets that developed in the axils of uninjured leaves on the current year's growth. Like winter killing, this type of branchiness is also a juvenile character, for on mature trees branches normally develop only from dormant buds of the previous season's growth. The number of such branches was found to vary with the size and exposure of the tree. Nevertheless there were significant differences among progenies. The two progenies from Worthington developed over twice as many branchlets from the non-dormant buds as any of the other progenies did.

On the basis of both winter killing and branchiness, the progenies were separable into

[1]This study was made while the author was instructor in forestry at Purdue University. Grateful acknowledgment is made to R. C. Brundage and Arvid Tessaker for their help in collecting seeds.

[2]Wright, S. Isolation by distance under diverse systems of mating. Genetics 31 (1): 39-59. 1946. The neighborhood is the largest population in which breeding can be considered to take place at random.

at least three different *biotypes* (a biotype is a group of plants that are similar in their genetic makeup): (1) a very winter-hardy, branch-free type (some progenies from Tippecanoe County); (2) a moderately winter-hardy, branch-free type (progenies from Jackson and Johnson Counties and some from Tippecanoe County); and (3) a non-hardy, branchy type (progenies from Greene County).

There are three possible ways in which the grouping of these biotypes may be considered. First, they may be distributed at random throughout the population. Second, they may be aggregated into *clines* (a cline is a population in which there is a gradual change with distance in the frequency or intensity of a character). Third, they may be aggregated into local or geographic races.

The first possibility is most likely within the area covered by the Tippecanoe County parents, as the parents were not observed to be separated by any breeding barrier that would be necessary for the formation of a cline or race. The absence of significant differences between the Jackson County-Johnson County and the most winter-sensitive Tippecanoe progenies indicates that this possibility may also apply to the entire Jackson County - Johnson County - Tippecanoe County population. On the other hand, there is justification for considering the Greene County parents as belonging to quite another population (either a different race or a different portion of a cline), since the progenies differed from the others in two characters and the parents were separated from the other parents.

The differences in winter killing and branchiness were not correlated with any obvious character of the parents. This is not unusual in view of the small number of parents tested and the varied conditions of their development. Hence the results indicate only what may be accomplished by progeny tests and do not help in the selection of mother trees within a race or portion of a cline.

These findings are of practical importance on two counts. First, they demonstrate the genetic diversity in a species of tree within a limited geographic area. This diversity was great enough to be brought out by one-parent progeny tests of randomly selected parents. Much greater diversity (and consequently greater possibilities for the tree breeder) could be brought out by two-parent and vegetative progeny tests of selected parents.

Second, they demonstrate the likelihood of the formation of distinct races within relatively

TABLE 1.—WINTER INJURY AND BRANCHINESS OF SILVER MAPLE PROGENIES

Progeny number and locality of parent	Average Jan. temperature in parent's locality[1]	Length of stem killed in winter 1942-43	Branchlets on current year's (1943) wood
	°*F.*	*Centimeters*	*Number*
1. Lafayette, Tippecanoe Co.	27.5	[2]4.4	[3]3.2
2 Lafayette, Tippecanoe Co.	27.5	8.6	5.2
3 Lafayette, Tippecanoe Co.	27.5	7.3	3.0
4 Lafayette, Tippecanoe Co.	27.5	13.4	6.3
6 Lafayette, Tippecanoe Co.	27.5	9.7	3.0
7 Seymour, Jackson Co.	32.8	12.4	4.3
8 Amity, Johnson Co.	30.1	13.3	5.8
9 Worthington, Greene Co.	31.1	15.9	13.2
10 Worthington, Greene Co.	31.1	18.6	11.8
Variance due to:		F values as calculated by analysis of variance	
Parent (8 d.f.)		[4]3.29	[5]6.60
Block (3 d.f.)		1.71	3.58

[1]U. S. Department of Agriculture. Yearbook of Agriculture 1941, Climate and Man.
[2]Least significant difference (5 percent point) between progeny means is 7.5 centimeters.
[3]Least significant difference (5 percent point) between progeny means is 4.0 branches.
[4]Significant at 5 percent point.
[5]Significant at 1 percent point.

small distances (about 100 miles) in the climatically uniform Middle West. Thus they point to the danger of collecting seed from one locality for use in all parts of the Middle West. They also indicate a possibility of obtaining different enough races so that some degree of hybrid vigor may result from inter-racial crosses.

Abstract of Master's Thesis

The Dielectric Properties of Wood at Several Radio Frequencies.[1] By Christian Skaar. The New York State College of Forestry, Syracuse.

ELECTRIC measurements were taken on wood samples from thirty different tree species, to determine their perpendicular-to-grain dielectric constants, power factors, and resistivities at 2- and 15-megacycles, respectively. Data were compiled for each sample at the oven-dry condition, and at several moisture contents up to 15 plus percent moisture. Samples of buckeye were measured, using 2-megacycle frequency, at moisture contents up to 114 percent. Four of the thirty woods were measured to determine their dilectric properties parallel-to-the-grain.

The results of the investigation indicate that the perpendicular-to-grain dielectric constant for wood is dependent essentially on its density and its moisture content, irrespective of kind. The dielectric constant was found to increase with increase in the frequency used; it also increases exponentially with increasing moisture content below the fiber saturation point, and in a straight-line ratio above this point. The parallel-to-grain dielectric constants proved to be 30 to 50 percent higher than the corresponding perpendicular-to-grain values, at the lower moisture contents.

The power factor and resistivity of a given piece of wood are dependent primarily upon its moisture content. A weak correlation was noted between the density of oven-dry samples and their power factors. Under the same conditions, a stronger but negative correlation was found to exist between densities and measured restivities. The respective power factors proved to be greater at the 15-megacycle frequency than at 2-megacycles when the moisture content of the samples was less than approximately 15 percent. Above this point, the reverse held.

The parallel-to-grain power factors of the samples were approximately double their corresponding perpendicular-to-grain values at 2-megacycles. In contrast, the parallel-to-grain resistivities were found to approximate half their perpendicular-to-grain values, measured under similar conditions.

[1]This paper will appear as Technical Publication 69 of the New York State College of Forestry.

Notes

Bill Howard—An Appreciation

ONE day early in February 1927, the forestry staff of the Conservation Department at Albany was called into the front office, to greet a lean, active, energetic man in his fortieth year, who had just been appointed to the Number One forestry job in New York. The man was William G. Howard, and for many of us there in the room it was the beginning of a relationship that was to last for nearly 22 years, terminating only with Bill's sudden death last October. During these two decades we were to witness an expansion of the Division of Lands & Forests and of the whole Conservation Department, that could hardly have been envisioned in 1927. We were to see programs come and go, and some continue to develop: the Enlarged Reforestation Program, the CCC, the gypsy moth barrier zone, the modernization of our fire fighting organization, mechanized nursery operations, winter-sport development in the Adirondacks, and the Forest Practice Act. For 22 years we were to live with Bill Howard in the office and on the road, under four governors and five different commissioners, through good times and bad. Thus, we came to know him as few men ever know their chief, and when the end came, our loss was an extremely personal one.

Bill Howard's public career is a matter of record,[1] and an obituary note in the January *Forestry News* marked his passing. It seems fitting at this time however, to look back over the years and remind ourselves and the profession of some of those personal traits which had so much to do with the mark he left on the Conservation Department and on those who were privileged to work under him.

Devotion to the job, and participation in strenuous out-of-door activities were perhaps, Bill Howard's most outstanding characteristics. His sense of responsibility for the conduct of the work and for the State properties entrusted to his care was of the highest, and news of any trouble on the Forest Preserve, affected him almost like a disaster in his own household. In the matter of physical stamina, he early established his reputation, and when he was in his prime there were few men in the field who were anxious to follow Bill on a trip to a mountain station. During the time he was in charge of forest fire control, he walked the three miles from his home to the office, on a split-second schedule. Tennis, and later golf and skiing, were his constant week-end hobbies. Probably the dreariest periods of Bill's existence were those occasional lapses between the last snow at Adirondack Lodge and the first golf play on the Albany course!

Bill's driving energy made itself felt not only in the handling of the job, but in everything he did. Extremely competitive, he always went "all out" to succeed, whether it was on the athletic field, in the conference room, or beating his own time from Saranac Lake to Albany. His exploits at the wheel of a car became legendary, and a ride with him the first time was something of an experience. Yet, so extraordinary were his reflexes, and so instant his decisions, that in all his years of driving he was never involved in an accident of any consequence.

Two things Bill Howard never forgave: laziness and dishonesty. Mistakes might be forgiven, but the man who soldiered on the job or who played fast and loose with state property, was done for.

Bill's office door was always open to us, as was his mind to the opinions we had to express. I remember a time that I was to present a committee report at the New York Section meeting on a somewhat controversial subject. "Mr. Howard," I said, "the recommendations of this committee aren't going to jibe very well with the stand the Department's taking on this business." He looked at me with the familiar twinkle in his eye: "Well," he said, "this is a professional meeting. If we haven't enough intellectual honesty to stand a few real differences of opinion, we'd better call it quits."

All of us felt, I think, that Bill's pace was too fast, and that he took a lot out of himself by a too persistent application to detail. But that was his code and he held steadfastly to it. Even following his desperate illness in 1944, he gradually picked up the reins again and within a year was hitting almost his old stride. Many a man in his position, with years of honored service behind him, would have been content to re-

[1] We present. William G. Howard. Jour. Forestry. 43:298 299. 1945.

tire, or to "coast along" on the job. Not so with Bill. He was still the "head man," right up to that Friday afternoon which was to be his last on duty. Sometimes it seemed, in those latter years, as though he had a disregard, almost amounting to contempt, for his own frailty.

All Bill Howard's associates have mourned the fact that one with his many active interests, his keen enjoyment of good living, and love of travel, should have been struck down almost at the three-score mark—that he could not have lived on to gather the harvest of the years. Yet Bill, himself, was not of the temperament to get satisfaction from a life's evening of contemplation and retrospect. He was an "action" man, first, last and always; and the manner of his passing, severe shock though it was to his friends and family, was completely characteristic of Bill's whole pattern of living. On Saturday morning he said to Mrs. Howard: "I feel so good today that I think I'll go out to the Club and play a round before lunch." He never finished his game, but feeling distressed after a few holes, started back to the club-house. Halfway there, he collapsed and died almost at once. Thus he reached the journey's end, as he would have wished it, "with his boots on."

If I were to find fitting words to describe Bill Howard's attitude toward life, I think I would quote from Teddy Roosevelt's familiar exhortation to young men: "In life as in a football game: don't foul and don't shirk, but hit the line hard."

E. W. LITTLEFIELD,
Albany, N. Y.

Coming Events

Forest Products Research Society Meeting

The third annual national meeting of the Forest Products Research Society is to be held at the Civic Auditorium in Grand Rapids, Mich. on May 2-4. This meeting which will be the only national meeting of the Society this year, will be open to nonmembers as well as members and is expected to draw an attendance of more than 500 persons from all parts of the United States and Canada.

Six technical sessions have been scheduled. The general subjects to be discussed include raw material and its preparation, furniture and plywood, chemical utilization of wood, machining of wood, technical development of research, and seasoning.

The Society extends an invitation to everyone interested in forest products to attend this meeting. It is not necessary to be a member. The Pantilind Hotel will be the headquarters in Grand Rapids.

Address all queries to C. E. Van Hagan, Secretary, Forest Products Research Society, Box 2010, University Station, Madison 5, Wis.

Gulf States Section

The annual meeting of the Gulf States Section will be held in Nacogdoches, Texas, May 26, 27, and 28.

Information about the program may be obtained from the Section secretary, Marvin G. Angle, Box 587, Nacogdoches, Texas.

Erratum

On page 66, January issue, JOURNAL OF FORESTRY "Fundamentals of Hardwood Logging" listed in "Current Literature" should read "Fundamentals of Logging."

Austrian Consolidated Form for Management Data

A single form for recording stand and site descriptions, a 10-year working plan, execution of the plan, and proposals for the next 10-year plan has come into use on the state forests (that is, forests owned by the national government) of Austria. The form is printed on sheets 14 inches wide by 19 inches long, with half of the form on each side of the sheet. In use, however, all the data pertaining to a given area are entered on opposite pages, making the form in effect 28 inches wide by 19 inches long. Stand and site data and working plan are typed on the sheets, and the sheets are then bound into a volume. When the volume is opened, the two facing pages contain all the data for any given area. As the plan is carried out, additional data are entered by hand. The bound volume for a 50,000-acre forest in the Salzburg Alps is 3 inches thick. A series of these volumes for successive 10-year periods constitutes a detailed history of the forest.

The column headings and rulings, scale 1/1.6, together with typical column entries, are reproduced in the accompanying tabulation.

LEFT-HAND PAGE

Servitude	Compartment	Subcompartment	Description of site	Description of stand	Age class (years)	Site index	Stand density	Area, hectares	Wood volume				Silvicultural treatment or cutting
									Per hectare		Per area		
									Decid.	Con.	Decid.	Con.	
									Cubic meters				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
II	22	a	Flat to W slope 15-20%; Alt., 1500-1700 meters; Vaccinium, Rhododendron	Spruce, larch, Pinus cembra; very uneven stand; many old trees originally left for seed; many bare spaces	120-140	V IV III	0.0 0.4 0.8	20.67	0	181	0	3740	Group shelterwood cutting

RIGHT-HAND PAGE

Wood production																	Planting							
Cutting plan 1939-1949					Wood cut										Proposed work plan 1949-1959		Work plan 1939-1949			Planting done					
Area to be cut over, hectares	Volume per ha to be cut, cubic meters	Volume per area			Year wood was cut	Cutting (reproduc. clearcut, thin, etc.)	Area cut over, hectares	Volume							Area, hectares	Total volume to be cut from working area	Areas not completed preceding plan	New plantings, this plan	Replanting failures, newly drained areas, etc	Year planted	Areas not completed preceding plan	New plantings, this plan	Species planted, thousands (to nearest 1/10)	Seed, kg or hl	Plants, thousands	Excess areas planted not called for on plan
		Dec.	Con.	Total				Timber		Fuelwood		Subtotal		Total for year	Cumulative total											
								Dec.	Con.	Dec.	Con.	Dec.	Con.													
		Cubic meters						Cubic meters									Hectares			Hect.						
(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
0.30	175	0	52	52	1941		0.10	0	10	0	6	0	16	16	16						1940	2.04				9.2	
					1942		0.06	0	1	0	9	0	10	10	26												
					1943		0.10	0		0	17	0	17	17	43				.02							.10	
					1944		0.04	0		0	6	0	6	6	49				.10							.43	
					1945		0.05	0		0	8	0	8	8	57									Spruce 1.20 Larch .10		1.30	

Brief comment on and explanation of some of the columns is given below.

Column numbers are not used on the original form. They are used here only to emphasize the continuity of the strip of column headings and for convenience in discussing the form.

Column 4. In some cases, mention of the soil class would appear to be desirable.

Column 7. In the forest from which these data were taken, site quality was indicated in some cases on a scale of ten divisions, although Austrian forestry handbooks invariably use a scale of five divisions.

Column 12. Column 9 multiplied by column 10.

Column 13. Column 9 multiplied by column 11.

Column 14. The German for the heading of this column is "Wirtschaftliche Behandlung," which might be translated as management treatment or handling. Column 21 shows the particular cutting (e.g., thinning, reproduction cutting, final harvest cutting) of the general system of column 14.

Column 19. Columns 17 plus 18.

Column 27. Column 23 plus column 25. Dec. is abbreviation for deciduous.

Column 28. Column 24 plus column 26. Con. is abbreviation for coniferous.

Column 29. Sum of columns 23 through 26 (or 27 and 28).

Column 30. Sum of items in column 29.

Columns 33-42. Although some data are missing from these columns, enough is given to show the use of this part of the form. Note that the item 1.30 in column 41 is the sum of the items in Column 39.

Doubtless this form would be even more effective if provision were made for financial data and man-hours.

A map of the forest at a scale of 1/20,000 (1 in. = 1,666 ft.) supplements the form. This map shows the villages and highways surrounding the forest, the forest roads and paths, drainage, compartments and subcompartments, and, by means of contrasting colors and symbols, 20-year age-classes and kind of work to be done on each area (if any) during the period covered by the plan. The quality of the drafting is high. Data is gathered in the field in suitably ruled notebooks. As the plan is carried out, progress is plotted on a map in the office (scale: 1 in. = 225 ft.). About one technically trained forester is employed per 4,500 acres and one year-round forest worker per 400 acres.

This form and the supplementary maps indicate the extent of the data and manpower required for the practice of intensive forestry.

MERTON HENRY,
Bevans, N. J.

We Present

Sherman Adams

WHEN Governor Sherman Adams declared in his inaugural address at Concord, New Hampshire, on January 6, 1949, "Better forest management is an essential part of sound conservation," he was not voicing pretty phrases coined by someone else. On the contrary, he was expressing with forthright conviction the sentiments of a woods-wise forester, who has always seen both the forests and the trees.

For the first time since 1935, when Gifford Pinchot completed his second term as governor of Pennsylvania, an active member of the Society of American Foresters is the chief executive of one of these United States.

Whether the Granite State's new governor can succeed in finding that happy compromise between the individual's freedom to decide where, when, and how to cut his timber and outright federal regulation of cutting practices is a question that will be observed as closely by the forestry profession at large as in Governor Adams' home state, where 80 percent of the area is woodland.

The Forester-Governor was born in East Dover, Vermont, in 1899, a descendant of Henry Adams, founder of the Quincy Massachusetts branch of the Adams family, among whom were John and Samuel of Revolutionary fame.

Soon after Sherman's birth, the Adams family moved to Providence, Rhode Island, where their son attended elementary and high school, before entering Dartmouth College at Hanover, New Hampshire, in 1916. The nearby White Mountains proved an effective antidote for the industrial surroundings of his school years and he became an active member of the Dartmouth Outing Club. He served as its secretary during his junior year and was elected president the next year. As his election campaign prospectus explained, "His association with the Dartmouth Outing Club attracted him to New Hampshire permanently."

Upon graduation in 1920 he decided to find work somewhere in northern New England. While his classmates turned to the cities for their graduate studies or professional employment, Adams took the nearest job that suited his liking—as a scaler at a logging camp operated by the Black River Lumber Company in Vermont.

It wasn't long before the boss became ill and the young scaler had a chance to prove what a college education and a personal interest in the forests and their people could produce. Under his management, logging costs were soon dropping as production steadily climbed.

The company's main office noticed the increasing efficiency of its Vermont branch and within a short time Adams became woods superintendent of the Parker-Young Company at Lincoln, New Hampshire, where he has made his home ever since.

For nearly twenty years it was his responsibility to locate, log, and deliver to the mill the one hundred fifty cords of pulpwood needed to keep its digesters operating each day in the year and 5-10 million board feet used in its sawmills annually. In the meantime he became a Junior Member of the Society of American Foresters in 1930 and a Senior Member in 1939.

In 1940 he decided to enter competitive pub-

SHERMAN ADAMS

lic service. Unlike some foresters who prefer the security of civil service or others who cherish the higher salaries of private employment, Adams sought to promote his ideals in the vicissitudes of state politics.

In that year he was elected to the New Hampshire House of Representatives and served as the chairman of its Committee on Labor. Two years later he was elected unanimously Speaker of the House, which lays claim to the title of being the second largest legislative body in the United States with its four hundred independent-minded members.

In 1944 Adams was elected to Congress where, as one of the two Representatives from New Hampshire, he served on the Flood Control and Labor Committees. Two years later he ran against the incumbent governor and was defeated in the Republican primary by 157 votes on the recount, out of a total of 46,024 cast.

Now in 1949 Sherman Adams finds himself one of the few new Republican governors in any of the states. He also finds himself the chief executive of a state with declining tax revenues and increasing financial obligations.

Adams is a genuine "family man." In 1923 he became the proud husband of Rachel White of Mount Holly, Vermont, and today he is the father of three talented daughters and a promising son, twelve-year-old Sam.

Sherman Adams' affiliations with forestry associations are too lengthy to list in this summary. Suffice it to say that he is a long-time director of the Northeastern Lumber Manufacturers Association, a veteran member of the Executive Committee of the Society for the Protection of New Hampshire Forests, a recent president of the White Mountains Region Association, and an active director of the New England Council.

As the author of the 1941 State law creating forest advisory boards and the first chairman of the Grafton County Forest Advisory Board the new governor is personally aware of the opportunities and limitations of such groups.

His personal views on forest policy were expressed in a significant address at the 1936 Silver Jubilee observing the passage of the Weeks Act at Bretton Woods, New Hampshire, in which he concluded, "For a common understanding, industry must be more and more conscious of the public interest, willing to cooperate, collaborate and capitulate in the public welfare, while the recreational majority must concede to industry its rightful inheritance, the means to survive and feed its people. With a more general understanding of the inherent responsibilities of public ownership will come a consciousness of the respective provinces of the various interests in our national forests. The province of industry can be no more and no less than the inheritance of its legitimate birthright."

More recently, in 1948, as spokesman for the Northeastern Lumber Manufacturers Association, Governor Adams stated in part in the association's impressive publication, *Serving the Nation's Greatest Lumber Market;* "Regardless of statements from some sources indicating that growth has exceeded the cut in the Northeast in recent years, the depletion of merchantable timber resources since 1939 is severe. The problem, as we view it, is not an insurmountable one. We believe that through the cooperation of landowners, lumber producers, state and federal agencies and the public, the basis of a sound public forest policy can be determined and followed."

Foresters have preached their gospel in many locations from the deacon seat of a logging camp to the Halls of Congress. What a one-time woods boss will do, now that he has become the governor of one of our states, remains to be seen, but his many associates in the Society of American Foresters wish him well.

ROBERT S. MONAHAN.

Points of View

Effect of Shade on Loblolly Pine

W. S. Wahlenberg's interesting study "Effect of Forest Shade and Openings on Loblolly Pine Seedlings" establishes the fact that increasing high shade is increasingly detrimental to the survival and growth of loblolly pine seedlings. Because of the seedlings exposed to side light, 58 percent survived 5 years, growing .7 foot per year, and the same in small openings 15 to 30 feet wide, the author draws the conclusion that this rate of survival and growth permits of the practice of single tree selection forestry, on a 5-year cutting cycle. From these premises it follows that fire must be excluded as a means of securing proper ground conditions for reproduction and this is the theory practiced on the Crossett Experimental Forest where the study was made.

The author says nothing about the effect of low shade of brush in preventing reproduction of this pine, and in killing those seedlings that germinate under such conditions. The reviewer's experiment in Urania, La., whose records run from 1931 to date, continues to show deaths occurring in pine saplings at an average of 5 years after they have become overtopped by hardwood growth. No pine that started 2 or more years after the initial fire and seeding has so far survived longer than this after the overlapping occurred. Those that started in the same year with the hardwood sprouts have outgrown them 25 percent in height.

The old French proverb for preparing rabbit stew—"First catch your rabbit"—applies appropriately to the problem of bringing loblolly pine reproduction through hardwood competition. First get your reproduction. If fire is excluded continuously from this type, hardwoods have a very strong competitive advantage in occupying small openings, or coming in as the result of thinnings. It was strikingly evident in the Urania experiment above mentioned, that the hardwoods which were shaded possessed far greater ability to survive than did the pine.

This fact was adequately accounted for by Kozlowski and Scholtes in their recent article[1] in the JOURNAL OF FORESTRY for October 1948, in which they showed that the total length of root of 1-year seedlings of white oak was 2.4 times that of pine seedlings of the same age, while for 7-weeks old black locust seedlings the root surface area was nearly 12 times that of corresponding loblolly pine seedlings. The relatively greater ability to capture soil moisture combined with their probably greater tolerance of shade enables the hardwood understory to suppress and kill the small pines.

Were it not for low hardwood competition, and only in its absence, the loblolly pine seedlings can and do survive for periods up to 20 years while retaining their capacity for recovery and normal height growth. These conditions exist in about a half shade of high forest, but never in my experience under dogwood or any other low hardwood shade, which is fatal to the pine seedlings. I have never known loblolly seedlings to grow up through such brush, except when they invade longleaf pine sites and compete with blackjack oaks.

My conclusion is that because of these problems, widely encountered in this type, the single tree selection system on a 5-year cutting cycle will prove a failure except in situations where initial hardwood competition is not encountered.

H. H. CHAPMAN.

[1]Kozlowski, T. T. and W. H. Scholtes. Growth of root hairs on pine and hardwoods in the Piedmont. Jour. Forestry 46:750-754. 1948.

"General Education for Students of Forestry"

The editorial "General Education for Students of Forestry" in the August, 1948 issue of the JOURNAL OF FORESTRY describes concisely but fully the aims of a college education with specialization in forestry. The enumeration of what that education should achieve brings into sharp focus the major educational problem of today—how to accomplish the task in four years.

The only answer to that problem is to increase the period of formal training to five years. The undergraduate college course of study was adopted when the total of general and technical knowledge was so meager that it could be encompassed in a four-year college course.

Obviously, research has increased the amount

of forestry knowledge that should be imparted to the professional students. Also, the greater complexity of the modern community and research in the field of human relationship has added much that should be placed before professional men of all kinds if they are to assume intelligent leadership. So where four years of training was adequate in the horse and buggy days when the four-year college curricula were adopted, that short period of training is no longer adequate.

The details of adjusting to a five-year curricula, and the increased cost of such a lengthened period of training both to the state and to the individual, must not prevent universities from serving the purpose for which they were established, to train men and women to give leadership in making this world a better place to live in. Today, restricted by the woefully inadequate and antiquated concept of four years of training, they are not meeting the challenge of a modern world. Even though the complexity of human life has increased and technological knowledge increased to meet this situation, the university still retains the time honored pattern of a hundred years ago.

P. A. HERBERT,
Michigan State College.

Blister Rust

Mr. Hirt's paper in JOURNAL OF FORESTRY December, concerning white pine blister rust reminds me that I made a long-time study of the disease which never has been reported.

When I retired in 1922 to a typical white pine area in Vermont where blister was present but doing little harm, I with several neighbors, resolved to devote our area to a show-down of what Nature intended to do. Frankly I was urged to this test by a doubt that the blight was as dangerous as it was reported to be, or was likely to repeat our experience with Chestnut blight. In this test we contented ourselves chiefly with "watchful waiting." Beyond that we carefully spared all wild gooseberries and limited our cutting to the dead and dying trees—mighty few. While this was going on observations in other parts of Vermont indicated that our immediate section was not specially favored.

At the end of twenty years, about 1944, I have no copy, I reported my facts and observations to the Bureau of Plant Industry and suggested that the disease is not so widespread, and perhaps not so dangerous, as we are still told that it is. My communication is still unacknowledged—probably "lost" as unwelcome reports sometimes are.

I am rather disappointed that this contribution to our understanding of this threat to our white pine forests has not been taken up: this is written in the hope that my effort will be followed up.

ALFRED GASKILL.

February 8, 1949

Dr. Hardy L. Shirley
New York State College of Forestry
Syracuse 10, New York
Dear Hardy:

Your letter of January 28 regarding the note on white pine blister rust that Gaskill wishes to publish in the JOURNAL OF FORESTRY came in while Ray Hansbrough was with us here at Beltsville. About 2 years ago, James F. Martin, in charge of blister rust control, Bureau of Entomology and Plant Quarantine, requested our Division to go over the reports of the blister rust control work in the Northeast and appraise the work accomplished by the control program in that area. We assigned the task to Perley Spaulding and Ray Hansbrough. Ray, therefore, has all of this fresh in mind. I asked him to supply some information which I could send on to you and he has kindly done so. His comments, copy attached, express much the same opinion as that furnished by Dr. Hirt.

Mr. Gravatt has taken up with Dr. Martin the viewpoints and inquiry raised by Mr. Gaskill. Dr. Martin recalled that blister rust control officials stationed in the field have visited Mr. Gaskill and have inspected his estate at Brandon, Vermont. The first inspection was made on August 6, 1946, and the second on September 12 of the same year. With Dr. Martin's kind permission we are forwarding to you a copy of the report and of correspondence pertaining to the field trips on which it was based. It will be noted from these enclosures that there are only a few ribes plants on Mr. Gaskill's estate and that white pine blister rust was not at all serious there, although some cankers were found.

I am at a loss to know what became of the report that Mr. Gaskill sent to the Bureau of Plant Industry in about the year 1944. We have not

located the report in this Division. I am extremely sorry about this. Mr. Gaskill surely was entitled to an acknowledgment of his contribution.

[We are returning the enclosures forwarded to me with your letter of January 28.]

It is our view that blister rust control is now being operated much along the lines that Mr. Gaskill recommends. Inspections are made and eradication is carried out mainly where the abundance of ribes and of rust and consequent risk to the pines warrant the operation. If further information is desired regarding Mr. Gaskill's inquiry and recommendations we are sure Dr. Martin will be glad to cooperate and have his field men look into the situation.

Very sincerely yours,
LEE M. HUTCHINS,
Head Pathologist in Charge.

Editor's Note: The opinions of Dr. Hirt and Dr. Hansbrough referred to by Dr. Hutchins are: Virulence of attack by blister rust varies considerably with location. In a few locations the attack is mild. Generally white pine is highly susceptible and rust control the only effective means of saving it. They feel that control efforts should not be lessened.

In Defense (Not Praise) of the Swivel Chair Forester

Henry I. Baldwin's observations in the January JOURNAL on the paradox of finding so many foresters in our cities must have caused many a twinge of conscience and many a nostalgic pain within the bosom of ex-dirt foresters. For in a limited sense Henry is right in likening the urban forester to a fish out of water. The trouble is that you can neither understand nor solve the problem within the frame of reference suggested by Henry, namely that of the forest and the forest worker. Cities, despite all of their deficiencies—and it must be noted that no urban dweller escapes them—are a characteristic product of Western civilization. They were brought into existence by realistic forces within our economic and social life, and continue today to meet the special needs and functions for which they were established.

Forests and their products become "resources" only as they contribute to the vast web of our human value system. They are part of that web today, indistinguishable in the main from, say, iron, oil, or wheat. No more important, and no less. No more independent, and no less.

Incorporated into every known system which displays what we term "organization" there are specialized structures that perform the functions of communication and control. In our culture the processes of communication and control generally come to focus and are integrated within cities—more specifically within the minds of groups or individuals that spend most of their time receiving intelligence, relating this data to a broader matrix of social and economic purpose, and making decisions which are fed back into the "motor" parts of the social structure for action. Forest products are not grown, harvested, processed and distributed to users in a vacuum. All of these activities take place in relationship to a host of other interdependent activities. If there are problems of public policy, then one finds it convenient to be close to the legislators and political leaders of the community, state, or nation. If there are problems of finance and credit, then it makes sense to be close to the banks and insurance companies. If there are marketing and distribution problems, it is sound to operate close to the major centers of consumption. One must not confuse the city's inefficient use of individual lives with its demonstrated efficiency for serving as a central nervous system for economic society.

It's fun to dream of the day when the telephone, radio, television, and jet propulsion may change all this and reverse the centralization trend, putting society back on a diffused small-town basis. I doubt that the technological potentiality of decentralization will be realized until we develop and apply a comparable science of psychology which banishes (if indeed this is either possible or desirable) the need for gregarious face-to-face contact with fellow human beings.

My point is that a certain number of foresters are *compelled* to work and live in cities. Just what the percentage is at a given time represents a measure of our efficiency in the art of communication, control and organization of human energies. I grant that the urban part of the forestry hierarchy can become dangerously top-heavy, even parasitic. This is true of every enterprise, not just forestry alone.

If one accepts the premise, then, that a certain percentage of foresters must leave the for-

est—in order that woods forestry may be effectively carried on—the nature of the problem is significantly changed. Now the problem is one of selection, how to find the forester best equipped and adapted to the rigors of swivel-chair forestry. This in turn brings us to face with the fact that there are various degrees of removal or abstractness involved, ranging from staff work for the United Nations' F.A.O. on down to the most "earthy" situation.

There are compensations in swivel-chair forestry, just as some engineers are satisfied to design dams they do not build or planes they never fly. Research and operating reports may be a poor substitute for the scent of pines and the ring of an axe, but they are intelligible and can serve as observations sufficiently valid to permit decision making. Let's be realistic in our appraisal of the urban forester, or rather the fact that some foresters have to get out of the woods. Perhaps their health, happiness, and effectiveness leave something to be desired. On the other hand, where would we be without them?

HOWARD E. BALL,
Knoxville, Tenn.

Abstract of Master's Thesis

Effects of Treatments to Induce Germination of Seeds of Several Species Valuable for Soil Conservation Plantings. By John P. Krier. University of Idaho, Moscow.

THE dormancy problems of six species are reviewed: *Juniperus occidentalis, Juniperus scopulorum, Prunus emarginata, Rhamnus purshiana, Sorbus sitchensis,* and *Symphoricarpos racemosus.* The attempts to effect the breaking of the dormacy and, or, the increase in germinative energy according to the specific individual problems involved are described. Treatments included cold stratification in various media at constant temperatures for periods up to 22 weeks, seed coat "scarification" by periods of soaking in concentrated sulphuric acid up to eight hours, and investigation of the effects of soaking seeds in thiourea solutions before stratification.

Both species of *Juniperus* indicated a need for cold stratification periods longer than twenty weeks. They did not appear to have been injured by one hour in acid.

Prunus emarginata gave no response to treatment. Eight-hour acid treatment appeared the maximum possible without injury.

Rhamnus purshiana was not visibly affected by thiourea as used.

Sorbus sitchensis germination increase appears probable with stratification periods over 25 weeks in peat. Arasan "SF," a commercial fungicide, was utilized in 2 percent solution and was found effective in preventing fungal decomposition of seeds in stratification.

Symphoricarpos racemosus responded no better than in previous treatments and, as with them, good germination occurred in cold stratification but ceased when planted at room temperature. Secondary dormancy apparently occurred, and need for a specific germination temperature was indicated.

Reviews

Forestry in Germany—Present and Prospective. By C. A. Schenck. 42 p. Newsprint Service Bureau, New York. 1948. $1.

In this pamphlet, Dr. Schenck attempts to show that "the salvation of West Europe is closely interwoven with the salvation of the German forests, and that a flourishing West Europe requires flourishing German forests."

It is only natural that a German forester would be inclined to take a pessimistic view of the present situation, and perhaps Dr. Schenck may have exaggerated a little. For example, the assertions that "a few anxious years of over cutting have been enough to destroy forever the equilibrium of production and consumption," and that "whatever the rate of afforestation may be, . . . the efficiency of German forestry is sure to have gone forever by the year 1957 or earlier." Forever is a long time. The estimate of 17 million festmeters exported from the French zone in 1946 may be exaggerated, as Dr. Schenck indicates, but his conversion to board-feet equivalent certainly is; it would be nearer 4 billion than 68 billion.

The author attributes the present state of affairs to the long period of overcutting (for instance, in Baden the cut was increased from the pre-Hitler 56 cubic feet per acre to 136 cubic feet in 1947); the failure of natural and artificial reforestation to keep up with the cutting (although the American zone is "decidedly better" than the other zones in this respect); the shortage of foresters and skilled woodsmen, caused by the "denazification" of these groups (more sweeping in the American zone than elsewhere); and the shortage of efficient tools and equipment. He fails to mention that some of the heaviest overcutting was done to salvage timber that had been damaged by insect infestations, storms, and fire.

It is easy to understand and sympathize with Dr. Schenck's complaint that so much good timber has been "wasted" for fuel when there is a shortage of timber for pulp and other products. One may well ask, however, whether the German people's need for heat was not as urgent as their need for paper, and whether the wood—which was available—was wasted when used to provide the necessary fuel in an emergency, when other materials could not be had.

There can be no doubt that the German forests have suffered and are still suffering severely from the short-sighted vengeance-inspired policies of the occupying powers. The facts that the mismanagement was started by Göring—as Schenck admits—and that overcutting will have to be continued for some years to meet the essential needs of Germany and her neighbors does not excuse deliberate and unnecessary reduction of the yield capacity of the forests. Yet this policy has been seriously proposed, officially and unofficially, by Americans and others, and to some extent has been adopted. It is hard to understand how any forester can support such a proposal.

Dr. Schenck points out the insanity of the Allied Control Council's program for removing practically all trees more than 80 years old, for the alleged purpose of eliminating Germany's power to make war. He asserts that it will eliminate production of railroad ties, pulpwood, mine props, and most of the lumber and construction timber. This would hardly be true of mine props and pulpwood, which normally are cut from trees less than 80 years old. In fact, reduction of rotation to 80 years would not decrease the potential production of pulpwood, which is most emphasized in the "war potential" theory because of its use in making cellulose products. As Schenck says, "the annihilation of the war potential of the German forests brings about necessarily a grievous diminution of the peace potential of all West Europe." He asks: "Would it not be better, instead of destroying them, to place the German forests—like the German coal mines—under an international control and actually try and increase their productiveness? Why would it not be a good plank in the good Marshall plan to demand: 'The forests of Germany shall be conserved and improved for the benefit of all West Europe.'"

These sentiments bring to mind Gifford Pinchot's address before the American Scientific Congress in 1940 in which he said:

"Needless waste or destruction of necessary resources anywhere threatens or will threaten,

sooner or later, the welfare and security of peoples everywhere. Conservation is clearly a world necessity, not only for enduring prosperity but also for permanent peace. . . . War is still an instrument of national policy for the safeguarding of natural resources or for securing them from other nations. Hence international cooperation in conserving, utilizing, and distributing natural resources to the mutual advantage of all nations might well remove one of the most dangerous of all obstacles to a just and permanent world peace."

It is unfortunate, not only for Germany but for the world, that these principles could not have served as the basis for the Allies' policy for dealing with the German forest resources.

W. N. SPARHAWK.

❦❦❦

A Manual of the Timbers of the World. By Alexander L. Howard. 3rd ed. 751 pp. Illus. Macmillan & Co., London and New York. 1948. $11.

When Karl von Linné (Linnaeus) undertook the task of naming all the animals and plants, he is presumed to have done it because the names then in use not only differed from language to language, but lacked scientific accuracy and usefulness. The trouble with common names in Linnaeus' time, and in our own, is that they often fail to indicate relationships. In short, they do not lend themselves to classification. The Swedish savant's brilliant solution of this difficulty was the invention of double names based on Greek and Latin root-words. Thus all oaks receive the name *Quercus*, and each kind has a second name to distinguish its species.

Despite the two hundred years of scientific precedent since Linnaeus' arrangement of plants according to their families, classes, and genera, an occasional book is still published with the trees arranged on some other basis. That is what the author did in the present instance.

The late Alexander L. Howard brought out the first edition of *Timbers of the World* in 1920. It had been finished in 1918 at the end of the first world war. The second edition appeared in 1934. This third edition was almost, but not quite, completed before his death in 1946. In this as in previous editions, common names, if well known, have been used for the alphabetical headings; alternative vernacular names together with botanical names have been added where possible.

That the author's system of an alphabetical order based on common names has distinct merit in a work of this kind is self evident. That it also leads to some confusion is unfortunately true.

By way of example, let us consider hemlock. Using the author's alphabetical system we turn to hemlock and find listed *Hemlock, mountain* and *Hemlock, western*, two Pacific Northwest species. But what about eastern hemlock and the asiatic species. To locate them we look up *Tsuga* and find *T. sieboldii* and *T. dumosa*, but still no *T. canadensis*. The index, voluminous as it is, does not help us. Has eastern hemlock been omitted? No. By chance we find it listed under *Spruce, hemlock*.

Similar vagaries will be encountered in the listing of the many species which comprise this book. For example, Douglas fir will be found listed under the name of British Columbia pine; our English cousins probably stick to this name for the same reason that the British Admiralty early in the recent war insisted on stating its requirements for Douglas fir as Oregon pine.

Lest it be assumed that these comments are made in any carping sense, this reviewer hastens to explain that they are simply mentioned to indicate that, in order to obtain full benefit from this volume as a reference work, one needs to employ a certain amount of intelligent cooperation. If it is a tree, the author doubtless has it listed somewhere, though perhaps not where an American would expect to find it. The user of this reference work must remember that its original purpose was to provide information on the principal timbers of the world of importance to British importers. This is not to say that it has little value for American users; in point of fact, the author has drawn heavily on the writings of Samuel J. Record and F. W. Foxworthy whose books on the timbers of the western hemisphere and of Malaya and the Philippines are standard works in their fields.

Extremely valuable portions of the book are the several indexes. In one the author provides a list of the timbers of the world classified according to the country of origin. In addition to the usual general index, he has an index of scientific names and, perhaps most helpful of

all in a work of this sort, an index of vernacular names. One obtains some conception of the world-wide ramifications of tree nomenclature in the 47 double-column pages of this index of vernacular names.

More than 1500 species are described. In general each description gives the common and scientific names, vernacular names, country or place of origin, weight of the wood, and other information concerning its appearance, properties, commercial possibilities, and bibliographical references.

Truly a monumental work, this manual is a veritable treasury of knowledge about the world's timbers and the trees from which they come. Because of its global coverage, no other volume in English even approaches its scope. Although its especial value is as a source of reference, the the book will provide many hours of interesting reading about the strange trees and the exotic woods of faraway places.

HENRY CLEPPER.

A *Survey of State Forestry Administration in Ohio.* By Alfred B. Hastings and John B. Woods. 44 pp. Joint committee of the Society of American Foresters and Charles Lathrop Pack, Forestry Foundation, Washington, D. C. 1947.

The conclusions of this study are presented in sixteen recommendations supported by brief, but cogent, presentations of facts.

Of the 3,700,000 acres of forest land in Ohio, the yearly growth in saw timber is estimated at less than 60 board feet per acre. Ninety-five percent of these obviously understocked woodlands are in private ownership. The report states that the slow progress of forestry in the state cannot be attributed to taxation. It suggests that one immediate need is to increase the farm forestry program to include 12 farm foresters rather than 4 as at present, that the state nursery production should be stepped up from about 5 million to 13½ million. These trees should be sold at a price which should eventually recover all costs other than for administration.

It is further suggested that the state forests and forest park areas should be increased, with the objective of acquiring 25,000 acres a year for the next twenty years to reach a total public acreage of 600,000 acres. To obtain adequate fire protection for the entire forest area of the state was calculated at 6.1 cents per acre, and the report recommends a gradual increase in state appropriations for that purpose so that the ultimate goals may be reached.

Funds for forest research are now considered inadequate in Ohio. The report urges a state appropriation of at least $20,000 a year for this purpose and recommends the establishment by the U. S. Forest Service of a forest research center in the state. The Ohio Forestry Association is currently engaged in a campaign to raise a trust fund of $2,000,000 to be deposited with the state so that the income thereof would be available for forest activities. It is also recommended that the College of Agriculture should require a minimum of three credit hours in farm forestry of all students who are prospective farmers, farm planters, county agents, or vacational agriculture teachers.

It is not to be expected that any reviewer would agree with all of the recommendations. For example, the report does not suggest that the tax payers of Ohio should finance the forestry education of the young men of the state who desire to enter the profession. At least there should be a strong and complete preforestry curriculum at one state supported institution. The tax payers of neighboring states are training Ohio's foresters, and the lack of adequate professional training in the state has resulted in comparatively few Ohio young men entering the profession.

The report suggests there is some duplication in farm forestry activities; it recommends that the allocation of responsibility should be along functional lines. It does not suggest where the division shall be, and even if it did, the reviewer believes any functional division is impossible to achieve except on paper. In his opinion there are only two ways of avoiding the waste of tax payers' funds in the present scramble throughout the country to assist the private forest landowners; one is to divide the responsibility on a special basis and the other is to place one agency in overall charge.

Despite these minor differences of opinion, the reviewer applauds the courageous report and hopes that funds will be found to permit such surveys in many other states.

PAUL A. HERBERT,
Michigan State College.

Forest Pathology. By John Shaw Boyce. 550 pp. Illus. 2nd ed. McGraw-Hill Book Company, Inc. New York, N. Y. 1948. $6.

Reviewers of the first edition in 1938 commented on the author's thoroughness and conciseness in assembling available data and his careful selection of helpful references for those concerned with diseases of forest trees. The same high standards are maintained in bringing the book up-to-date on new developments in the field during the past ten years.

Although revisions of text have been extensive, the new edition wisely retains the original approach to the subject. Organization of contents again is based on the part and type of tree affected rather than on the taxonomic position of the casual fungi. Diseases of shade trees and the pathology of forest products are subordinated as before, in order to avoid any sketchiness in covering forest tree disease problems. Approximately 1500 citations at the end of the various chapters leave little doubt as to the completeness of literature review. These references represent not only several hundred papers on new work but also the substitution of recent publications rich in bibliographies for some of the earlier citations. Foreign literature is used effectively to round out discussions of specific diseases and to point out problems that could easily confront us.

A comparison of the two editions impresses one with recent developments in the field of forest pathology. These are indicated by changes in emphasis on previously mentioned diseases and the inclusion of a number of new problems. On the whole, the changes in space allotted several diseases are considered more in accord with current thoughts on relative importance. For instance, southern workers will agree that the fusiform rust problem on slash and loblolly pine justified more attention than it received in the first edition. Undoubtedly, some readers will still feel that certain diseases of dubious importance are given undue coverage in comparison to others of greater potential damage. The reviewer is one of these but realizes that absence of publications for reference by the author is primarily responsible for the situation. The acceptance of the late G. G. Hedgcock's taxonomic treatment of the pine-oak rusts is a particularly welcome change which should eliminate confusion in the names of some of our most common rusts of conifers.

Among new tree diseases are the pole blight of western white pine, little leaf of shortleaf pine, phloem necrosis of elm and wilt of oak in the mid-western states, mimosa wilt in the Appalachians, canker stain of sycamore and Phymatotrichum root rot of various species in alkaline soils. The most important of these from a forestry standpoint are the little leaf and pole blight diseases; the causes of these are unknown but their symptoms and effects are fairly well known. The recent discovery that elm leaf hoppers can transmit the virus causing phloem necrosis makes the book somewhat out-of-date on this disease.

In the field of products pathology, new but rather brief sections appear on such subjects as decay and other fungus deterioration of boats, aircraft, plywood, and glues. All these subjects were considered important lines of investigation during the war period. In discussing decay in buildings, the author understandably emphasizes the causes and control of substructure deterioration because past literature has dealt largely with this aspect. Actually, damage due to decay of exterior lumber such as porches, steps, siding, window sash and frames, etc. probably takes a heavier toll in replacement costs.

A timely new paragraph in the concluding chapter advises caution in accepting the early promise of exotic or native trees outside of their natural habitat as a criterion of performance until maturity. Another caution that might have been stressed is that the experience with native diseases gained from old stands may prove misleading when applied to young stands. This realization already has led to some surprises and disappointments.

The first edition has been considered standard equipment as a text and reference book for student use and for technical and practicing workers concerned with forest disease problems. The author should be complimented on making the second edition equally indispensable for those who wish to be currently informed.

RALPH M. LINDGREN,
Division of Forest Pathology.

Genetics in Swedish Forestry Practice. By Bertil Lindquist. 173 pp. Illus. Svenska Skogsvardföreingens förlag, Stockholm. The Chronica Botanica Company, Waltham, Mass. 1948.

How every practicing forester can make immediate, effective use of genetics to improve for-

est production is the message of this publication. The method suggested is the purposeful selection of the best trees to be the parents of all new stands, whether naturally reproduced or planted. The meat of the message is not new to American foresters. But in our literature, selection as a phase of genetics is usually touched on in treatises on tree breeding where it must compete with the intriguing subject of hybridization, or in seed manuals where it is diluted by details and statistics on collection, storage, pretreatment, and viability of seeds. Here is a book on all the ways that selection is useful to practical foresters, and on selection alone, so that its importance stands out clearly and forcefully—a book that pulls us up short by revealing unmistakably the truth of a lesson we once half-learned and had nearly forgotten: You can't expect to grow good trees from poor parents.

Henry Baldwin in his review of the Swedish version of the publication (JOURNAL OF FORESTRY for May, 1948) said, "Seldom can a reviewer venture to state that a book is a significant new contribution to forestry. The present volume may well prove to be one of the most important contributions recently published and its coming translation into English should be eagerly awaited by foresters to whom the original is inaccessible." Here is the translation and the English is excellent. The author's English friends whose cooperation he acknowledges are to be congratulated, for the text is readable and understandable.

Lindquist's chapter on the deterioration of Sweden's forests resulting from cutting the genetically best trees and leaving the runts to breed is a reproof to us because we have done the same thing. In attempted justification we ask, "But has anybody proved that broad crowns, crookedness, limbyness, slow growth, and susceptibility to rot are inheritable?" Lindquist cites forty years of experience in Denmark, Sweden, Switzerland, and Austria toward that proof. He recognizes the limitations of some of the studies and says, "But the general results of the experiments should justify the conclusions that certain of the characteristics of our forest trees which are most important from a forestry point of view, such as rapidity of growth, and branch- and bole-types, are subject to hereditary variation of which practical use should be made." The degenerate trees that have followed uncontrolled cutting throughout Sweden are warning enough of the risk of disregarding the evidence.

The first step is to describe genetically desirable trees so that they can be recognized. In Sweden this job is well along for the dozen or so kinds of trees that grow there. Lindquist takes 33 pages to cover the details. We have hardly begun work on our 100 or 150 important timber species. For some of them at least we shall want to choose fast growth, narrow crowns, and tall straight boles, the qualities desired by the Swedes for their pine.

Having determined what qualities we want and how to recognize the trees that possess them to a superb degree, we must begin to favor these elite trees in all our cuttings. Lindquist says, "The present opinion is that coursely branched trees in a young stand never will attain the same good natural pruning as the slender-branched, narrow-crowned trees." In diameter-limit cuttings we fell the largest, tallest, cleanest, fastest-growing trees, forgetting that we may thereby be favoring those that by inheritance are rougher and slower growing. We choose broad-crowned, branchy trees as seed trees because they have big cone crops. Isn't this wrong if we want slender-crowned, clean-boled trees in the next generation? The man with the marking axe must bear in mind, from the time of the first thinning forward, the need to work for a better second crop by eliminating the genetically undesirable trees and by making the desirable ones ready to reproduce their kind.

Where planting has to be done, its higher cost makes disregard for genetics even more wasteful. We have begun to be more careful to collect seeds near the planting site so that the trees will be genetically suited to the climate. But we have paid too little attention to gathering seeds from elite stands and elite trees. The Swedes, meanwhile, have actually invaded our territory. They have come to the Lake States and sent back home cuttings from genetically desirable trees. Lindquist uses a large part of his book to tell how they have scoured their own country for elite stands and trees, how carefully they control the collecting and distribution of seeds from them, how they have increased the supply of elite seed by making special seed-producing plantings from seeds or scions of elite trees, and how early and profuse fruiting of these plantings has been encouraged by bark-ringing and by grafting the scions on to rootstock that is exceptionally floriferous. He shows that the extera cost of elite

seed is far outweighed by the better quality of the crop and the shorter time required to grow it. Seed orchards assure a steady supply of seed that can be economically harvested. Planting stock of trees narrow-crowned and fine-branched by inheritance need not be closely spaced to force natural pruning, and so costs in labor and trees can be saved.

The book is full of fascinating details, suited for direct adoption here or suggesting modifications we could use. It should be read widely by foresters in this country, so that we may be inspired to perfect a sure method for improving our forests that have been neglected even under the most intensive of present practices.

JESSE H. BUELL.

Forestry and Forest Industries in the USSR After the War. By Dr. R. Buchholz. 14 pp. Reichsinstitut fuer Forstwirtschaft, Reinbek b. Hamburg, Germany. 1948.

This brochure includes the most recent statistics on the forest and forest industries in Russia about which the author is a recognized authority. During the war he was an expert on Russian forests with the German Army of Occupation. He has published several books on the subject, but unfortunately the entire edition of his most recent book was destroyed during the bombing attack in the fall of 1943. The material herewith summarized is a synopsis, and completes the record so far as is possible.

1. The post-war additions to the Russian forest area aggregate 13 million hectares, or 32,110,000 acres, of which the areas formerly in Finland are 3.0 million hectares (7,410,000 acres); in Latvia 1.7 million (4,199,000 acres); in Esthonia 0.9 million (2,223,000 acres); in Lithuania 0.9 million. (2,223,000 acres); in Poland 5.5 million (13,585,000 acres); and the other additions 1.1 million (or 2,717,000 acres).

The proportion of forest in these areas varies from a maximum of 50 percent in Finland to a low of 15 percent in Lithuania.

Even before the beginning of the war the forests of the Baltic states and of Poland had been excessively cut. Consequently, little is expected from these until after a period of recovery.

2. The new five-year-plan for forestry of the Russian administration covers the years 1946-1950, and places emphasis on the reconstruction and development of the forest and of the forest industries. This plan is not to be considered as a program, but as a directive; namely, it must be literally carried out, just like a law. Under it the various areas in the European and the Asiatic part of Russia have been assigned definite figures for cutting by volume and by categories of material. In the aggregate these represent an enormous total; not less than 159 thousand cubic meters or 39,750 M bd. ft. of construction material, and an almost equal quantity of fuel wood. Spread over the entire Russian forest area of nearly 500 million hectares, or 1,235,000,000 acres, this is very considerable utilization. It represents roughly one per cent of the growing stock of 33,846 thousand cubic meters, or 8,461,000 M bd. ft., of merchantable timber.

3. A special feature of the new five-year plan is the relocation of many of the industries with respect to sources of raw material, especially in the eastern part of Russia proper, and in Siberia where it is planned to open up areas which hitherto had no markets. For example, in the farthest eastern Siberian area it is estimated that there are 280 million hectares, or 692 million acres, of forest with an enormous volume present of 19 million cubic meters, or 4,750,000 M bd. ft. There not less than 37 thousand cubic meters, or 9,250 M bd. ft. are planned to be cut per year.

In addition to the expansion of roads, it is also planned to improve the rivers for rafting and floating logs, a very important matter since it opens up areas that hitherto were inaccessible.

4. In respect to the technical attainments, it is planned to expand and develop the production of various categories of wood; particularly the export material into Europe proper. Hitherto this was difficult because of certain technical drawbacks whereby Russian export was hampered. With the occupation of eastern Germany these difficulties are being overcome, and lumber and other forest products are increasingly being shipped into Europe where they find a ready market. This is also to a less extent true of the export of raw material, namely, pulpwood and mine timbers, which, since 1936, have increasingly become an important fraction of the total.

In all instances the Russian climatic factors exercise a controlling drawback, since many of the ports of export are closed by ice from five to six months of the year, and navigation lasts only from May until the beginning of October.

5. Finally, since the end of the war, the Russian government has paid particular heed to the development of its forest resources and realizes

that in this respect it has a commanding position in the world. In Finland the loss of 10 percent of its forest area and 15 percent of its paper production to the Russians, together with the high demands for reparation, have enabled the USSR to dominate the situation. With respect to Sweden, which was heavily overcut during the war, there is little danger of competition, and of course Norway is even of less importance in this respect. (It should be noted these are Russian viewpoints; not necessarily those of the translator.)

As regards Canada, it is being written off as a "tributary of the U. S. A.," and since the Ottawa conference in 1932, as a competitor only in the British markets where it has "Empire preference" for its forest products.

There remains then, the question which seems always to enter into the Russian viewpoint; namely, whether in the event of world peace it would be possible so to develop Russian forest industries as to give them a premier position in the world? Certainly the five-year plan makes this its goal, and in addition to satisfying the requirements of the Soviet Union itself, it wants particularly to develop the export business just as soon as possible. There is not the slightest indication of any tendency to import any forest products from any other country, a policy decided on political as much as on economic grounds.

The western European countries that have an exportable surplus are thereby in their own interests forced to find markets other than those in the Soviet Union, and it is particularly important that this be clearly understood.

This publication is available through the indicated institute, and is well illustrated with maps and charts, as well as with tabular data in great detail.

A. B. RECKNAGEL,
St. Regis Paper Company.
Syracuse, N. Y.

❦❦❦

Botany and Our Social Economy. By Alexander C. Martin. 30 pp. Illus. National Wildlife Federation, Washington, D. C. 1948.

In addition to emphasizing the importance of plants in human existence and welfare, *Botany and Our Social Economy* furnishes food for thought on two other subjects currently holding the attention of educators, statesmen, states rightists, and do gooders alike.

One of these is the necessity of realizing the interrelations of climate, topography, inorganic resources, and living things—humans included.

The other is the responsibility of an individual, not only to strive for his own well-being, but to ensure opportunities for generations to come equal to or better than his own.

American resources have been dangerously exploited. The very length of time required to replace forest vegetation amazes some. Another barrier to restoration of resources is present human attitude. Dr. Martin says, "We will first have to revise our concepts of natural resources as private property and will also need to submit to wise regulations in the use of these resources."

He points out that several different kinds of beneficient government regulation (local, state, and federal) have been already instituted, and maintains that through education a future citizenry can be established that will consider its use of resources a stewardship for succeeding generations.

The responsibility for and the amount of an individual's contribution to society is a dynamic problem.

And everybody won't agree to one method of solution.

ROBERT D. HOSTETTER.

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Der Privatwald in der Schweiz (*Private Forests in Switzerland*). By Albert Huber (with synopsis in French and in English). Zurich, Leeman Ag. publishers. 331 pp. 1948.

The author, a young Swiss forester, at present a resident in British Columbia, wrote this while on the staff of the Swiss Institute of Technology in Zurich. It is a timely and informative treatment of a subject which greatly concerns American foresters: namely, how can forestry be brought to pass in privately owned woodlands.

The forests of Switzerland are small by American standards: 2,291,000 acres of which 30 percent is privately owned. We would call them, with almost no exception, farm woodlands—averaging in size only 3.7 acres.

The conditions in the hill country of northern Switzerland favor timber growing: there, in consequence, the forests are well stocked and the growth is high in volume and in quality. In part this is due to the fact that the cutting is regulated by protection-forest laws; the farmers' own attitude is largely one of forest preservation.

Less favorable are the conditions in the so-

called plateau country where many of the forests on pure, even-aged stands of exotics for which special treatment is needed. The growing stock is much lower than that of the publicly owned forests and the areas are very small—too small to meet the needs of the owners for forest products. Furthermore, the tracts are of such configuration as to be ill adapted to good management.

What the author recommends is, first of all, basic forestry education of the whole population and, specifically for the farmer-owner, instruction and aid in the best methods of treatment. We call this "extension," and assign specialists to the work. In Switzerland it has been part of the duties of all forest officers; obviously it has suffered because of administrative pressure of other work.

Dr. Huber would like to see all private forests in Switzerland placed under the direct control of competent, full-time, and adequately paid forest rangers. There is no such provision at present: Swiss law merely requires that all land be registered. If the forest land is so unfavorably divided in small lots as to preclude good management, it must be exchanged for land in one area before registration. The author would prefer to see these small and unfavorably shaped forests combined into a cooperative "commune" and that this be done by a surveyor and a forester working together.

Apparently, the whole problem of better private forest managemet in Switzerland is one of staff and finances. The author concludes that rather than resorting to compulsory regulatory control it would be to the interest of both owners and the public to facilitate better management by financial support and by example.

For those wishing to learn details of the problems of private forest land in Switzerland, this book is highly recommended as a fine source material. Dr. Huber has done a workmanlike job, including a ten-page bibliography.

A. B. RECKNAGEL.

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The Fig. By Ira J. Condit. 222 pp. Illus. Chronica Botanica Co., Waltham, Mass. 1947. $5.

The Fig is one of the most informative books on the subject. It should prove of great value to people whose interests range from geology to medicine. In fact, any man with a scientific bent of mind (particularly natural science) will find much to occupy his interest in the fig.

This publication makes available in one volume, in clear, condensed form, all the available facts, historical as well as scientific, presented by other authors in periodicals and books.

Information on the fig goes back to geological times and into the early history of man. Fig-tree worship precedes the worship of the oak and the almond. In many countries the fig tree was to the vegetable world what the swine was to the animal world.

Reference to the fig has been found in Babylonian history 2000 B.C. and is encountered frequently in biblical stories. It has played an important part in the growth and development of mankind ever since. It has been an important tree to the Mediterranean countries and to extensive regions in western Asia. It came to Europe during the Crusades and to the American continent in the early years of the colonies. George Washington planted fig trees at Mount Vernon.

This volume presents useful facts in the solution of the vital problem of feeding the world. Every scientist whose work brings him in contact with the life of trees will find much of interest in this volume. It is not a book for the horticulturist alone. It is a valuable asset to everyone who loves trees and is interested in trees—their enemies, their diseases, their uses, and their importance to the welfare of mankind.

WILLIAM H. ZEH.

❧❧❧

Factors in Botanical Publication and Other Essays. By Neil E. Stevens. Chronica Botanica Co., Waltham, Mass. 1947. $2.

This entire number is devoted to the re-publication of 17 articles selected from a very active and thoughtful career. The original publication of these essays was principally in *Science, Scientific Monthly,* and educational journals from 1920 to 1947. Under appropriate cover Dr. Stevens personally distributed this collection to those attending the dinner of the Botanical Society of America at the A.A.A.S. Meeting in Chicago, December 28, 1947, partially in lieu of his address as retiring president. After-dinner speakers might well heed his "Brevity at Botanical Banquets" in which the words of classic speeches of Paul, Franklin, and Lincoln are counted.

The scope of subject matter extends from the

author's specialty, pathology, to a friendly, if sometimes somewhat satirical, criticism of the broad fields of research, teaching and the practical philosophy of science. Dr. Stevens is strictly a free-thinking individualist and develops refreshing objectiveness in holding a mirror to scientists in such essays as "The Fad as a Factor in Botanical Publication." Much interesting material has been gleaned from such non-scientific sources as the New England poets, the Bible, and classic literature. Foresters will enjoy poetic "data" on pathology, ecology, and wood technology. Masters of modern methods of experimental design and interpretation may need the balance of "Botanical Research by Unfashionable Technics" and "The Anecdote as an Antidote to Statistical Analysis."

The hard-working scientist is realistically described and especially encouraged in two short articles. The sometimes harassed public servant is complimented and recognized for his unselfish virtues in "Bureaucracy as a Way of Life." One of the first to do scientific work in the government was Thomas Jefferson who actively carried on paleontological research with over 300 specimens housed in an unfinished room in the White House. Every educator who, in his musing, might envy the opportunities of the full-time research worker should read "Is Teaching Ability Recognized?" The answer is *yes* and rather striking proof is quoted.

At the end of the special number, Dr. Stevens' 192 articles, 1910 to 1947 (and continuing since), are listed.

In this reviewer's opinion, these collected essays serve the following functions well (1) They give a detached and remarkably objective critique on the problems of the working botanical or agricultural scientist. Yet, the points made are constructive and sympathetic in purpose, for they come from a man who has also been on the "inside." (2) The essays are in such lively and unrestrained form that the subtle and overt humor is a relaxing pleasure. All of us need to turn aside from too serious pursuit of scientific facts and see the human side of our attempted objectivity. Graduate students profit by reading this very engaging scientific philosophy in less pressing periods.

The forester-scientist owes it to himself to review his work patterns and basic philosophy in the light of Dr. Stevens' suggestions. It is immaterial whether the reader agrees, his orientation and perspective are bound to be favorably affected. Moreover, the collection is amply worth the price and time to read for the sheer joy of it. (Cf. "Applied Botany as Fun.")

PAUL C. LEMON,
N. Y. State College for Teachers.

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Compiled by MARTHA MEELIG, *Librarian*
The New York State College of Forestry

Range Management Section Compiled by
FRANCES FLICK, *Library, U. S. Department of Agriculture*

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Forest Products Research in Relation to Soil and Water Conservation. 8 pp. Pacific Northwest Forest and Range Expt. Sta., Portland, Ore. 1949. Mimeog.

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Outline of the Management of Fur Animals. By W. W. Chase and E. B. Beard. 46 pp. Illus. Overbeck Co., Ann Arbor, Mich. [1948] Lithoprinted. $1.75.

Tracks and Trailcraft. By Ellsworth Jaeger. 381 pp. Illus. Macmillan, New York. 1948. $3.95.

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Douglas Fir of the Western Pine Region; its Properties, Uses and Grades. 52 pp. Illus. Western Pine Ass'n., Portland 4, Ore. 1948.

The Nature of Reaction Wood. By A. B. Wardrop and H. E. Dadswell. pp. 3-16. Illus. Reprinted for the Council for Sci. and Indus. Research, Aust. from the Australian Jour. of Sci. Res. Ser. B. Vol. 1, No. 1, 1948. Div of Forest Products Reprint No. 103.

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Timber Connectors. By P. O. Reece. 8 pp. Illus. Timber Development Ass'n., Ltd., London E. C. 4. Construction Res. Bul. No. 1.

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Society Affairs

Officers and Members of the Council—1948-1949

CLYDE S. MARTIN, *President*
Weyerhaeuser Timber Company,
P. O. Box 1645,
Tacoma 1, Wash.

WILLIS M. BAKER,
Forestry Relations Division,
Tennessee Valley Authority,
Norris, Tenn.

PAUL M. DUNN,
School of Forestry,
Oregon State College,
Corvallis, Oreg.

JAMES C. EVENDEN,
Bureau of Entomology and Plant Quarantine,
U. S. Department of Agriculture,
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CHARLES F. EVANS, *Vice-President*
U. S. Forest Service,
Glenn Building,
Atlanta 3, Ga.

CHARLES H. FLORY,
State Commission of Forestry,
Calhoun State Office Building,
Columbia, S. C.

WILLIAM B. GREELEY,
West Coast Lumbermen's Association,
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CLARENCE S. HERR,
Woods Department,
Brown Company,
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HENRY CLEPPER, *Executive Secretary*
825 Mills Building,
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RICHARD E. MCARDLE,
Forest Service,
U. S. Department of Agriculture,
Washington 25, D. C.

DEWITT NELSON,
Division of Forestry,
Department of Natural Resources,
Sacramento 14, Calif.

JOHN W. SPENCER,
U. S. Forest Service,
Post Office Building,
Denver 2, Colo.

The Coming Election of Officers and Council Members. Second Call for Nominations

A President, vice president, and nine Council members will be elected December 10. Their term of office will be for the two-year period 1950-1951. The Consititution provides that they must be Members (formerly Senior Members) or Fellows.

The present officers and Council members whose term of office expires December 31, 1949 are listed in the box above. They are eligible for renomination provided they give their consent in writing to serve if elected.

President Martin has declined to be a candidate for re-election.

President and vice president. There must be at least two candidates for the office of president; preferably more. All candidates for president are considered as nominated also for vice president. The candidate receiving the highest vote is declared elected president. The candidate receiving the next highest vote is declared elected vice president.

Charles F. Evans, vice president during the term 1948-1949, has been nominated for the office of president, and has accepted the nomination.

Members of the Council. There must be at least nine candidates for the Council; preferably more, so as to provide contests.

Nominating procedure. Nominations for officers and members of the Council are made by petition. If a sufficient number of nominations are not made by petition, additional selections will be made by the Nominating Committee.

Nominating petitions are subject to the following conditions.

1. Each petition shall name but one candidate.

2. All candidates must be eligible to hold elective office; that is, they must be Members or Fellows in good standing.

3. Each petition must be signed by ten voting members (Junior Members, Members, and Fellows) who at the time of signing the petition are eligible to vote in the coming election.

4. A voting member may sign one nominating petition for president and one for member

of the Council. (In other words, he may sign two, but no more.)

5. Petitions must be received in the Society's office in Washington, D. C. on or before October 15, 1949.

6. No nomination is valid until the nominee accepts the nomination in writing and agrees to serve if elected. Petitioners should obtain the written consent of the candidate in advance and submit it with the petition.

Form of petition. An acceptable form of nominating petition is as follows:

"We, the undersigned voting members of the Society of American Foresters, hereby nominate _____ to the office of president (or member of the Council) for the regular biennial election of 1949."

Nominating Committee. President Martin with the approval of the Council has appointed the following Nominating Committee to serve for this election.

Chairman, William W. Nace, Oakland, Md.
C. R. Ross, Corvallis, Ore.
Harry R. Woodward, Pierre, S. Dak.
R. Bruce MacGregor, Macon, Ga.
M. E. Deters, Moscow, Idaho.

This Committee will make no nominations of its own unless the members at large fail to make a sufficient number to meet Constitutional requirements. It is up to the members to decide whether they want to select their own candidates by petition, or have them hand picked by a small committee.

Certainly, nominations made by petition are the more democratic way. Hence, members are urged to get busy and choose the men they want to run their Society, and do it promptly.

The executive secretary will gladly be of assistance to any members who desire assistance or need additional information.

WILLIAM W. NACE, *Chairman,*
Nominating Committee.

Membership Procedure and Preparation of Nomination Forms

Certain important changes have been made in membership procedure as a result of recent constitutional amendments.

The following instructions and information are for the use of the Membership and Executive Committees of the Sections, and of individual members, as an aid to them in preparing and submitting nominations for membership in accordance with the Society's revised constitution and bylaws.

Insufficient data on the nomination papers often prevent the Council from acting intelligently and decisively. Either the papers have to be returned to the Section concerned to fill in the blank places, or the Council is forced to vote negatively because proof is lacking of the candidate's eligibility. In either event additional time-consuming correspondence is required, and delays occur which are embarrassing both to the candidate and to the Society.

Section officers may assume that their approval of a candidate is sufficient evidence of his eligibility, and that the Council should confirm the Section's recommendation. It should be remembered, however, that in electing a member, the Council is acting for the whole Society, for all the 21 Sections. Thus for each candidate for membership, the most complete record obtainable should be made available to the Council by the Section.

Nominating Procedure

Four standard nomination forms are used:

1. Junior Member.
2. Member (formerly Senior Member).
3. Affiliate Member.
4. Associate Member.

On the reverse of each nomination form are outlined the requirements for the grade.

No special forms are used for Honorary or Corresponding members, or for Fellows. For information concerning nominations to these grades, write to the executive secretary.

Nomination forms provide space for recording the candidate's citizenship, education, experience, and occupation. All information requested is necessary to determine his eligibility.

Date and place of birth. For a nominee for Affiliate, Junior, or Associate Membership of foreign birth it is necessary, in addition to giving the date and place of his birth, to make it clear that he has become, or has taken steps to become, a citizen of the United States or Canada.

Education

A nomination for Junior Membership for a candidate who is a graduate of an approved school of forestry does not require Section endorsement or sponsor statements. The nomination may be endorsed by three voting members in the space provided for their signatures.

A nominee for Junior Membership who is a graduate of an approved school of forestry must give the name of the school, the year in which he was graduated, the degree or degrees conferred upon him, and must state definitely whether the degree covered professional instruction in forestry.

A nominee for Affiliate or Junior Membership who has had a partial forestry education must state the number of years or semesters completed at the school where this instruction was given.

A candidate for Affiliate or Junior Membership who took forestry courses, but who is not a graduate of a school approved by the Council, must submit a transcript of his scholastic record covering the forestry courses studied.

Approved Schools of Forestry

The following universities and colleges are approved for forestry instruction by the Council of the Society of American Foresters:

University of California School of Forestry, Berkeley.

Colorado A & M College, Division of Forestry and Range Management, Fort Collins.

Duke University, School of Forestry, Durham, North Carolina. (Graduate.)

University of Florida, School of Forestry, Gainesville.

University of Georgia, School of Forestry, Athens.

University of Idaho, School of Forestry, Moscow.

Iowa State College of Agriculture and Mechanic Arts, Department of Forestry, Ames.

Louisiana State University, Department of Forestry, Baton Rouge.

University of Maine, Department of Forestry, Orono.

Michigan State College of Agriculture and Applied Science, Department of Forestry, East Lansing.

University of Michigan, School of Forestry and Conservation, Ann Arbor.

University of Minnesota, School of Forestry, Saint Paul.

Montana State University, School of Forestry, Missoula.

New York State College of Forestry at Syracuse University, Syracuse.

North Carolina State College of Agriculture and Engineering, Division of Forestry, Raleigh.

Oregon State College, School of Forestry, Corvallis.

Pennsylvania State College, Department of Forestry, State College.

Purdue University, Department of Forestry, Lafayette, Indiana.

Utah State College, School of Forest, Range and Game Management, Logan.

University of Washington, College of Forestry, Seattle.

West Virginia University, Division of Forestry, Morgantown.

Yale University, School of Forestry, New Haven, Connecticut. (Graduate.)

Advancement to Full Member

Junior Membership is the temporay, probational entrance grade for professionally trained foresters.

A Junior Member may become eligible for advancement to full Member after he has obtained a minimum of three years of forestry experience. Thus a Section may nominate for the Member grade any qualified Junior Member who has completed three years of probation.

Accordingly, a Junior Member actively engaged in forestry work may be advanced to the grade of full Member in either one of two ways: (1) by nomination of his Section, or (2) by automatic advancement.

1. *Advancement by nomination.* A Section may nominate a Junior for advancement (a) immediately after he has been three years in forestry subsequent to the date he met the requirements for Junior Membership; (b) or after he has been three years in the Junior grade, but before the expiration of six years.

1 a. John Doe, on graduation from an approved school in June 1940, was eligible for Junior Membership. Though actively engaged in forestry work, he did not become a member until June 1945. By that time he had acquired more than "three years of forestry experience subsequent to the date he met the requirements for Junior Member." Knowing him to be a competent forester, his Section nominated him for advancement to full Member immediately upon his acceptance of election to the Junior grade.

1 b. Richard Roe was graduated from an approved school in June 1946 and promptly became a Junior Member. His Section considers him a good, competent forester and nominates him for Member as soon as he has served the minimum period of three years in the Junior grade.

2. *Automatic advancement* occurs when a Junior Member, actively engaged in forestry work, has been in that grade for six years, and his advancement is not protested on the grounds of incompetency or for other reasons.

2. James Snow, a professional forester, has been actively engaged in forestry work during the six years he has been a Junior Member. At the expiration of his sixth year, his Section endorses him for full Member, and in the absence of any protest is certified to the higher grade by the Council.

Annually the executive secretary will notify each Section of every Junior who is completing his sixth year of membership, and will request

a report on him, and an endorsement if he is considered eligible for Member.

Cases of questionable eligibility will be referred to the Council which is responsible for interpreting the phrase "actively engaged in forestry work." Junior Members who do not qualify for full Member may remain in the Junior grade.

Section Endorsements

Some Sections nominate candidates by vote of the membership in open meetings; others by their Executive Committee composed of the Section's elected officers; still others by the Membership Committee. Any procedure is acceptable as long as it is in accord with the Section's bylaws.

It is to be kept in mind, however, that at best it takes from two to three months to elect a candidate to membership after a nomination is received in the Society's executive office. While it is not intended, or desirable, to rush through nominations without proper and sufficient information, it is suggested that the Sections handle all nominations promptly.

Reinstatement

A former member of the Society may be reinstated to the grade of membership which he formerly held, but not to a higher grade. The standard nomination form, marked *Reinstatement* at the top, may be used.

A former member who resigned in good standing is eligible for reinstatement upon application.

A former member whose membership was terminated for nonpayment of dues must first pay back dues for the year or portion thereof in which he was in arrears before he is eligible for reinstatement. But former members who have served honorably in the armed forces, and who were dropped for nonpayment of dues during such period of service may be reinstated without payment of arrears within one year of their return to civilian life.

In no case is the candidate for reinstatement required to pay an initiation fee.

Publication of his name is required in the Society Affairs department of the JOURNAL, but neither Section endorsement nor the endorsement of three voting members is required.

Sponsor Statements

At least three sponsor statements are required for candidates for Junior Membership who are not graduates of approved forestry schools; and for all candidates for Affiliate and Associate Membership. These statements should always be made on the forms provided for that purpose.

Sponsor statements are required for a candidate for the full Member grade who is being nominated for advancement by his Section. These statements should be obtained from other Members or from Fellows. In the case of a candidate being automatically advanced to the Member grade, sponsor statements are not required; endorsement by the Section is sufficient.

Weak and incomplete sponsor statements probably cause most of the negative Council votes on nominations. The principal purpose of a sponsor statement is to show the candidate's professional competence.

Election Procedure

All nominations for membership should be sent to the executive secretary, who checks each nomination for endorsement and eligibility, as required by the constitution and bylaws.

The executive secretary acknowledges each nomination and informs the candidate of the procedure and approximate period required for election, and the provisions of the bylaws as to payment or extension of dues. Publication of the candidate's name in the Society Affairs department of the JOURNAL serves as acknowledgement to the Sections or group of individuals sponsoring the nominee.

The candidate's name is then listed in the *Announcement of Candidates* appearing in the next available issue of Society Affairs. Comment by members on the eligibility of candidates is invited.

When a candidate fails of election, the Section (or group of members sponsoring the nomination) is notified, and the comments of the Council members who voted negatively are given. This information is to enable the Section, if it so desires, to resubmit the nomination with additional supporting statements for a second ballot. In many cases this second ballot would be unnecessary if the original nomination papers were properly prepared.

Dues and Fees

Effective January 1, 1949 annual membership

dues are as follows:

For Fellows, $15.

For Members, $12 for their first six years in this grade; $15 thereafter.

For Junior Members, $6 for their first three years in this grade; $9 for their second three years in this grade; $12 thereafter.

For Associate and Affiliate Members, $6.

A fee of $5 is assessed upon original election to membership, but will not be assessed for advancement to higher grades.

Corresponding and Honorary members do not pay dues or admission fees. They may subscribe to the JOURNAL OF FORESTRY at the regular subscription rate, $6 per year.

HENRY CLEPPER,
Executive Secretary.

Northern Rocky Mountain Section Hears Four Speakers

Dean George A. Garrett of the Yale University Forestry School was the guest speaker at the Section's first meeting of the season November 3, 1948. He spoke on the condition and composition of the Northeastern forests and traced the trend of forest utilization in that region. The problems include small holdings, small mill installations, clear cutting, and utilization of small pole stands. Also, natural factors of fire, insects, and disease are bringing about changes in forest composition. Chestnut blight, Dutch elm disease, brown birch borer, and spruce budworm are altering both composition and economy of forests in the Northeast.

Those who attended the second meeting, December 2, 1948, heard Dr. J. W. Severy, head of the Department of Biological Sciences, Montana State University take *Time Magazine* to task for its review in the November 8th issue of two current books on conservation. The review was of *Our Plundered Planet* by Fairfield Osborn, and *Road to Survival* by William Vogt. *Time Magazine*, in a wave of unfounded optimism, scoffed these two well grounded books as pessimistic and prophesying scarcity. Dr. Severy said. He added that the review was full of half truths and distortions and that the reviewer showed no knowledge of ecological interrelationships whatsoever.

Following Dr. Severy's talk, the group enjoyed a stimulating discussion of the points and problems he had brought out. Then, over doughnuts and coffee, the discussion continued in a dozen or more independent sessions.

At the January 5th meeting, S. Blair Hutchison and Donald N. Matthews of the U. S. Forest Service, Missoula, summarized their 2-year study of the blister rust control problem in the white pine forests of the Inland Empire.

They pointed out that the control of blister rust is going to be considerably more expensive than was originally estimated. The necessity for closely coordinating blister rust control measures with other forest management work in the white pine stands was strongly emphasized.

Experiments with the new hormone sprays for killing Ribes plants are very promising. There is a need for speeding up research work on these sprays for the purpose of reducing the cost of control measures, Matthews and Hutchison said.

BEN M. HUEY.

New York Section Holds Winter Meeting

The New York Section held it's regular winter meeting at Albany on January 20th and 21st. About 150 registered for the sessions, which had as their theme "Section Operation."

There were no formal papers presented, but committee reports on compensation insurance, cutting practices, marketing, wood-using industries, ethics, national forest areas, control of insects, encouragement of forestry, mechanized logging, and public relations were presented by committee chairmen.

Considerable discussion centered around the chapter activities, and their relation to the Section and the parent Society. Henry Clepper, executive secretary, reported on the Society meeting at Boston, and on other Society affairs.

The Section banquet was attended by approximately 130 foresters. Harry R. Curnow, vice president and general manager, Whitney Industries, Inc., acted as toastmaster. Door prizes were distributed. The chief speaker was the Hon. Harold C. Ostertag, chairman of the Joint Legislative Committee on Interstate Cooperation, whose subject was "Forestry's Future in New York State." At the conclusion of the talk, Dean Joseph Illick presented Mr. Ostertag, on behalf of the Section, a testimonial commending him for his outstanding work in the field of forestry and conservation.

The second day of the program was given over to the executive session of the Section. Reports of the chairman, secretary-treasurer, etc., were presented, and several resolutions were acted upon. James D. Kennedy was elected as a member of the executive committee.

Movies and slides were shown at the meeting, and included "The Story of Wood in the Northeast," issued by the Northeastern Lumber Manufacturers Association, with photography by W. M. Harlow; "Community Backlog" by F. E. Carlson; and "Then It Happened" a pictorial movie of the Maine forest fires in 1947.

This meeting was conceded to be one of the best in Section history.

R. MILTON HICK,
Editor, NEW YORK FORESTER.

Society of American Foresters Central Rocky Mountain Section

Minutes of Meeting

A dinner meeting was held at the Olin Hotel Denver, on January 24, 1949, Chairman Arthur Nelson presiding. This was a joint meeting with members of the Wildlife Society and those of the American Society of Range Management whose interests were allied to forest and wildland management. Total attendance was 61, including 12 or more members of the Wildlife Society, and an equal number from the American Society of Range Management. Your secretary recognized a number who are affiliated with two and three of the participating Societies. It is hoped that the success of this meeting and last year's joint meeting with the Wildlife Society will have established a precedent for continuing annual get-togethers; the support of the Wildlife Society was assured by its Regional Representative, E. R. Kalmbach. Attending the meeting were 26 from Denver, 12 from Fort Collins, 13 from elsewhere in Colorado, and 10 from other states.

A short business session followed the dinner. Ralph Bryant, Section delegate, reported upon the annual meeting at Boston, and announced that the next Section meeting will be held at Fort Collins on Saturday, February 26.

Everett Lee, State Forester, read the title of HB No. 1060 which is understood to be aimed at the regulation of cutting of Christmas trees in Colorado. The bill, which has been introduced by title only and referred to the Committee on Forest Reserves, reads:

"A Bill for an Act relating to the preservation of the watershed areas of the State through the conservation of timbered areas, by providing for the inspection and regulation of the cutting of forest products for sale, providing a penalty for the violation of this Act, and repealing all acts or parts of acts in conflict herewith."

Mr. Nelson outlined recent action to accomplish distribution of the abridged Hasting's Report. He appointed a Nominating Committee consisting of T. Krueger (chairman), Bert Lexen, and Jack Wagar to submit nominations at the February meeting for new Section officers. (The By-Laws read: "The officers shall be elected biennially about May 1, by letter ballot, on nominations made at the business meeting next preceding this date").

Dr. Robert L. Stearns, President of the University of Colorado, and Chairman of the Colorado Resources Development Council, was the speaker of the evening. He told of the aims of the Council to develop planned and considered use of resources, in contrast with thoughtless exploitation that has too often occurred. The precarious climate of this Region necessitates recognition of the limitations of resource use. Our material resources of timber, grassland, agriculture, wildlife, recreation, metallic and non-metallic minerals, and water are being evaluated by the Council, not only from the standpoint of quantity, but to determine the possibilities of producing new products and new industries for their processing. Only through these surveys and presentation to the public of clear facts can the ills of selfish and ignorant exploitation be overcome. Using the range conservation issue as an example, Dr. Stearns cautioned against the use of emotional tactics for any real solution to the problem. He spoke of the human resources of the State and the need to maintain our educational institutions on a high level so that the young people of the Region are encouraged to educate themselves here and operate the industries that our resources will support. Informed intelligence is necessary to establish sound policy. It was a great satisfaction to learn that the Council is operating under such able leadership and that while developing the potentialities of our resources, their limitations are also recognized.

One of the most important points made by Dr. Stearns was the need for integrated development of all resources. Members of the three Societies in attendance represented special fields of thought and action; hence it was stimulating to have the situation with respect to other resources called to our attention, and to obtain a broader view of all of them and what is being done for their development and protection.

The meeting adjourned at 9:00 P.M. for informal discussion and warm fellowship—in marked contrast to the outside temperature of -3° F.

RALPH R. HILL,
Secretary-Treasurer.

Central Rocky Mountain Section Meets with Range and Wildlife Societies

Dr. Robert L. Stearns was the principal speaker at a joint meeting of the Central Rocky Mountain Section with members of the Wildlife Society and the American Society of Range Management held in Denver on January 24. Dr. Stearns is president of the University of Colorado and Chairman of the Colorado Resources Development Council.

He stated that the aim of the Council is to develop planned use of resources. An evaluation of the present quantities and future potentialities of resources is currently being made, including timber, grassland, agriculture, recreation, metallic and non-metallic minerals, and water. The limitations placed on the various resources by the precarious climate of the region are considerations which cannot be overlooked, he said.

Using the range conservation issue as an example, Dr. Stearns cautioned against the use of emotional tactics for any real solution of the problem. He also emphasized the need to maintain educational institutions at a high level so that young people of the region will be trained to operate the industries supported by the resources.

One of the most important points made by Dr. Stearns was the need for integrated development of all resources. Members of the three Societies attending were stimulated by having the resource situation in other fields called to their attention.

During a short business meeting following the dinner Everett Lee, state forester of Colorado, discussed a new bill in the state legislature designed to promote the conservation of timbered areas, with special reference to Christmas tree cutting regulations.

Ralph Bryant, the Section's delegate to the Boston meeting, reported on business and proceedings at the national convention.

Chairman Arthur Nelson appointed T. Krueger, Bert Lexen, and J. V. K. Wagar to the committee to nominate candidates for officers to be elected in May.

The meeting was attended by 61 persons.

RALPH R. HILL,
Secretary-Treasurer.

More on S.A.F. Membership Qualifications

P. O. Box 390
Salt Lake City 8, Utah
February 8, 1949

Dear President Martin:

Judging from the report I have had of the annual meeting in Boston, some misunderstanding exists as to the position of the Intermountain Section on proposed revision of membership requirements. The purpose of this letter is to dispel any possible misunderstanding and to state the position of the Intermountain Section anew. Copies of this letter are being sent to all members of the Council, all Section chairman, and Henry Clepper.

It will be recalled that the report of a special council committee on membership requirements and dues, consisting of Chas. F. Evans, DeWitt Nelson, and W. B. Greeley, was published in the August 1948 issue of the JOURNAL OF FORESTRY. Regarding the professional base of Society membership the committee proposed three questions on page 622 of that issue. In response to this I wrote you my letter of August 13, published on pages 787-789 of the October 1948 JOURNAL giving Intermountain Section viewpoints on the report. Here we proposed two alternatives, feeling that the third one proposed by the committee was too broad. These two alternatives,as ammended by my letter to you of November 10 are:

(1) Shall the present base for (Junior) membership be retained?

(2) Shall (Junior) membership be open to persons employed by an organization dealing with forestry problems who have professional training in other phases of wildland management equivalent to the training required of an approved forest school graduate?

You wrote me on November 12 that so far as you were concerned personally you would go along with our amended (2) with one addition. This addition was that the range man, soil scientist, or other specialist should have at least three years' experience with his career organization in order that he would fully understand the integration of his special field with overall forest problems. This was discussed at two recent Section meetings. We are in agreement with you on the principle that some period of employment with the career forestry organization is required. However, we suggest for the Council's consideration that a period shorter than three years might serve as a sufficient probation period.

I believe this will clarify our position on the basis for membership question and correct the impression which some individuals have that the Intermountain Section wishes to let the bars down completely and admit anybody who has a college education. Such is not the case. Based on discussion in Section meetings we favor the No. 2 alternative given above, with the addition of the time of employment factor as outlined above.

Sincerely,
JOE A. LIBBY,
Chairman,
Intermountain Section.

Utah State Agricultural College
Logan, Utah
January 27, 1949

Dear President Martin:

You requested my opinion concerning the liberalizing of the Society's entrance requiremens for new members. It may or may not agree with the general Intermountain Section opinion which has probably been clarified by Chairman Libby since Dean Turner has written him your request for clarification.

It is my opinion that the Constitution's present requirements for entrance already represent an adequately liberal base for acquiring new members who will fit into the purposes and aims of the Society. The difficulty comes in interpreting the intent of the Constitution. The Constitution provides that a man graduating in forestry from an accredited school is eligible for membership upon graduation. It also provides that a man may become eligible regardless of his background or special training after he has been engaged in applying his training to forestry problems for three years.[1]

This latter especially applies to men working for large organizations like the Forest Service. A man working in range management for the Forest Service becomes eligible for the Society because the dominant purpose of the Service is the management of timber. The Constitution assumes that a person associated with the Service for a given period absorbs a timber consciousness, but the Forest Service is essentially a wildland managing agency and contains many men whose timber experience is very limited.

What interpretation can be placed on the Constitution's provisions which makes it possible for a range man, a wildlife man, or an engineer to become a member as the result of associating and working with men who are foresters? The Constitution apparently recognizes that forestry is more than strictly timber management, and it implies that any man whose training or work qualifies him for wildland management is eligible for membership if he has acquired a knowledge of forestry principles and practices.

The eligibility for membership in the Society of the graduates of Utah State's School of Forest, Range and Wildlife Management is an example where the Constitution is interpreted to mean that only timber management men are eligible for membership. Graduates of the Forestry Department are eligible for membership at graduation because the school is accredited. At the same time, graduates of the Range and Wildlife Departments are required to get jobs with recognized forest agencies and work for a year or more to be eligible, in spite of the fact that they have taken 20-25 per cent of their professional training in forestry and have associated with students and teachers of forestry all during college. Although these men have considerable of forestry principles and practices, as well as some experience in forestry (via summer camp and summer jobs), the present limited interpre-

[1]Graduates of schools of forestry nonlisted are eligible for Junior Membership only after they have gained three years of forestry experience subsequent to graduation.

tation of the Constitution declares them ineligible for membership on graduation. It is true that many of the range and wildlife men may not gain employment with a forest agency, but it is also true that many of the foresters will not practice forestry. In both cases an application for membership is backed up by training in the Society's special interest of forestry, and by recognizing the Society as an organization devoted to the furtherance of the wise use of our wildland resources. The question is raised as to whether these graduates do not have as good or better idea of the principles and ideals of forestry than a man without forestry training after association with members of a forest agency for a few years.

In conclusion, it appears that the Constitutional provisions for membership are primarily interested in having the members possess a forestry background without necessarily being foresters. In addition, it singles out for membership only those with a forestry background whose work or training is directly connected with forestry or wildland management. In view of this interpretation, the Constitution itself does not need liberalizing so much as interpreting—an interpretation which provides that a man who is trained or experienced in wildland management and who possesses a knowledge of basic forest principles is eligible for membership according to the Constitution.

I suggest that when the referendum is drawn up the following choice be given (as well as any others being considered):

1. Leave Constitutional provisions as they are:
   (a) Interpreted as meaning only men trained in timber management to be eligible.
   (b) Interpreted, in a liberal spirit, as meaning a man trained or experienced in wildland management who has acquired a knowledge of basic forestry principles and practices to be eligible.

Sincerely yours,
T. W. DANIEL,
Professor of Silviculture.

Journal of Forestry Award for 1948

The Committee on the Journal of Forestry Award has selected the article "State versus Federal Competence" by the late Louis S. Murphy as the outstanding article published in 1948. Because the recognition is accorded posthumously, the customary prize of $100 is withheld, though Mr. Murphy's family has been notified of the honor. The prize paper appeared in the issue for January 1948.

Serving on the selection committee were Henry I. Baldwin, chairman, and James D. Curtis, Richard S. Kearns, George S. Kephart, and J. Hugo Kraemer. In evaluating the articles, the committee rated each paper according to ten different attributes, such as general appeal, reader interest, timeliness, etc., each characteristic given a score of 1 to 10, and a total scoredetermined for each paper.

Because the policy of making annual Journal awards has been questioned by numerous members, the Council has decided not to appoint any more award committees and not to include an item in the budget for this purpose. Accordingly, with the selection for 1948 this activity is terminated.

Dr. Baldwin's committee has been discharged with thanks.

Entire Graduating Class Nominated For Membership

All the foresters who graduated from Purdue University on February 6, 1949 have been nominated for Junior Membership in the Society of American Foresters, according to Roy C. Brundage, chairman of the Membership Committee in the Central Section.

Charles I. Miller, membership committee member in Indiana, was responsible, said Mr. Brundage, for securing the nominations of the 15 graduating seniors.

The Central States Section and Purdue University, by enlisting the support of 100 percent of a graduating class, have set a goal toward which other forestry schools may well strive.

Announcement of Candidates for Membership

The following names of candidates for membership are referred to the membership for comment or protest. The list includes all nominations received since the publication of the March JOURNAL without question as to eligibility. Names, addresses, education, and endorsements are given. The names have not been passed upon by the Council. Important information regarding the qualifications on any candidate which will enable the Council to take final action with a knowledge of essential facts should be submitted before May 15, 1949. Statements on different men should be submitted on different sheets. Communications relating to candidates are considered as strictly confidential.

Allegheny

Junior Membership

Anthony, S. W., Grad. Asst., Pa. State College, State College, Pa.; Pa. State, B.S.F., 1949. H. H. Chisman, H. N. Cope, Victor Beede.

Lee, C. N., Asst. Logging Supt., Insular Lbr. Co., Phila., Pa.; N. Y. State, B.S.F., 1949. L. P. Plumley, R. M. Hutchinson, R. G. Unger.

Lind, Orville E., Forester, U.S.F.S., Sheffield, Pa.; Univ. of Minn., B.S.F., 1947. L. E. Stotz, A. H. Anderson, C. L. Kinney.

Mulhollen, O. L. R.D. #1, Fallen Timber, Pa.; Pa. State, B.S.F., 1949. H. H. Chisman, W. C. Bramble, V. A. Beede.

Semmens, G. N., Student, N. Y. State College, Syracuse, N. Y.; N. Y. State, B.S.F., 1949. L. P. Plumley, R. M. Hutchinson, R. G. Unger.

Appalachian

Junior Membership

Friend, Edwin A., Jr., Dist. Mgr., Va. Forest Service, Charlottesville, Va.; Pa. State, B.S.F., 1948. G. W. Dean, S. G. Hobart, C. J. Witter.

Scudder, Kenneth T., Research Asst., Taylor-Colquitt Co., Spartanburg, S. C.; Univ. of Fla., B.S.F., 1948. K. R. Swinford, H. L. Newins, E. T. Ziegler.

Central Rocky Mountain

Member Grade

Gaylor, Harry P., Civil Engr., U.S.F.S., Denver, Colorado; Colo. A. & M., B.S.F., 1931. Reinstatement.

Central States

Junior Membership

Alley, G. W., Soil Cons., S.C.S., Cannelton, Ind.; Purdue Univ., B.S.F., 1949. Burr N. Prentice, C. I. Miller, R. C. Brundage.

Bonnell, Richard L., Box 422, Plymouth, Ind.; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Eaton, J. F., Student, Purdue Univ., Lafayette, Ind.; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Furlow, E. P., Grad. Student, Purdue Univ., Lafayette, Ind.; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Hall, J. E., Student, Purdue Univ., Lafayette, Ind.; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Hanson, John, Forester, Dept. of Cons., Forestry Div., Lansing, Mich.; Univ. of Mich., B.S.F., 1947; M.F., 1948. N. F. Smith, S. G. Fontanna, T. E. Daw.

Kinder, M. T., Wholesale Lbr., Houghton Lbr. Co., Indianapolis, Ind.; Purdue Univ., B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Krauch, H. C., Jr., Dist. Leader, Pittman-Robertson Proj., Indianapolis, Ind.; Purdue Univ., B.S.F., 1949. B. N. Brundage, C. I. Miller, R. C. Brundage.

Larson, W. T., Student, Purdue Univ., Lafayette, Ind.; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

McCraw, W. E., Logging Repre., Caterpillar Tractor Co., Peoria, Ill.; Univ. of Toronto, B.S.F., 1928. Reinstatement.

Michel, J. E., Student, Purdue Univ., Lafayette, Ind.; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Miller, B. J., 107 E. Station St., Barrington, Ill.; Univ. of Mich., B.S.F., 1949. S. W. Allen, Robert Craig, Jr., L. J. Young.

Perkins, R. H., R.R. #9, Lafayette, Indiana; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Sosbe, Edward H., Student, Purdue Univ., Lafayette, Ind.; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Winston, Frank A., Student, Purdue Univ., Lafayette, Ind.; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Woodling, R. H., Student, Purdue Univ., Lafayette, Ind.; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Wright, Lewis E., Edwardsport, Indiana; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Member Grade

Aamodt, Einar E., Forest Engr., U.S.F.S., Roscommon, Michigan; Univ. of Minn., (Agric.), (4 yrs.). Central States (Jr. member, 1939).

Bell, Lester E., Ext. Spec., Michigan State College, East Lansing, Mich.; Mich. State, B.S.F., 1937. Central States (Jr. member, 1943).

Lott, Edgar J., Dist. Ext. Forester, Purdue Univ., Lafayette, Ind.; Univ. of Mich., B.S.F., 1938. Central States (Jr. member, 1938).

Columbia River

Junior Membership

Crum, Ivan W., Dist. Forest Rgr., Willamette Natl. Forest, Oakridge, Oregon; Oregon State, B.S.F., 1936. C. M. Lord, D. D. Olin, W. F. Cummins.

Davies, H. G., Forester, Willamette Natl. Forest, Eugene, Ore.; Oregon State, B.S.F., 1949. R. F. Keniston, G. H. Barnes, W. F. McCulloch.

Kincaid, F. H., Forester, Oakridge Div., Pope & Talbot, Oakridge, Oregon; Oregon State, B.S.F., 1938. A. A. Wiener, L. C. Dunn, D. D. Crom.

Kischel, R. E., Log Scaler, Willamette Natl. Forest, Eugene, Oregon; Oregon State, B.S.F., 1948. A. D. McReynolds, R. F. Keniston, W. F. McCulloch.

Leavengood, R. G., Forester, Rogue River Natl. Forest, Medford, Ore.; Mich. State, B.S.F., 1941. R. W. Appleby, H. H. Clark, W. E. Bates.

Round, H. A., Apprentice, Medford Corp., Medford, Ore.; Oregon State, B.S.F., 1947. H. H. Clark, F. P. Jacquemin, J. C. Thomsen.

Vance, P. N., Wood Supply Supv., Fir-Tex Insulating Board Co., St. Helens, Ore.; Univ. of Wash., B.S.F., 1938. J. K. Pearce, G. D. Marckworth, B. L. Orell.

Vincent, Robert M., Resident Forester, Elk Lbr. Co., Medford, Ore.; Oregon State, B.S.F., 1947. B. S. Taylor, H. C. Sampert, W. E. Bates.

Watson, R. D., Asst. Forester, Weyerhaeuser Tbr. Co., Springfield, Ore.; Univ. of Mich., B.S.F., 1937. L. Calder, K. H. Bergeson, A. A. Wiener.

Member Grade

Marlatt, R. D., Partner, Mason, Bruce & Girard, Consulting Forester, Portland, Ore. Columbia River (Aff. 43, Jr. 48).

Stamm, Edward P., Logging Mgr., Crown Zellerbach Corp., Portland, Oregon; Ohio Northern Univ., B.S., (Civil Engr.), 1919. Columbia River (Asso. 37, Jr. 48).

Gulf States

Junior Membership

Andrews, John R., 616 Lafayette St., Baton Rouge, La.; La. State, B.S.F., 1949. R. W. Hayes, C. O. Minor, W. M. Palmer.

Goldsberry, G. K., Cons. Forester, % Frank Spearey, Nacogdoches, Texas; Purdue, B.S.F., 1949. B. N. Prentice, C. I. Miller, R. C. Brundage.

Hoover, Edward B., Asst. Dist. Forester, Int. Paper Co., Canton, Miss.; W. Va. Univ., B.S.F., 1948. A. K. Dexter, J. S. Tyler, R. M. Nonnemacher.

Moore, J. S., Asst. Forester, L. N. Dantzler Lbr. Co., Perkinston, Miss.; La. State, B.S.F., 1939. Reinstatement.

Odom, J. C., Asst. Dist. Forester, Gaylord Container Corp., Denham Springs, La.; La. State, B.S.F., 1948. R. J. Freshwater, J. E. Curtis, Jr., J. H. Kitchens, Jr.

Pearl, R. W., Forester, U.S.F.S., Forest, Miss.; Pa. State, B.S.F., 1948. I. W. Miller, R. H. Millar, J. W. Squires.

Rice, Herbert P., Forestry Aid, U.S.F.S., Jackson, Miss. Gulf States.

Rodrique, E. A., Dist. Forester, Masonite Corp., Laurel, Miss.; La. State, B.S.F., 1948. J. A. Olden, F. H. Hube, E. E. Chatfield.

Spector, A. H., Forester, Southern Forest Exp. Sta., New Orleans, La.; Pa. State, B.S.F., 1940. G. N. Stephenson, R. L. Hobba, H. Wilm.

Stephens, M. A., Jr., Asst. Dist. Forester, Gaylord Cont. Corp., Bogalusa, La.; La. State, B.S.F., 1948. J. H. Foil, W. Henderson, P. M. Garrison.

Underbakke, M. W., Forester, U.S.F.S., Forest, Miss.; Iowa State, B.S.F., 1942. I. W. Miller, R. H. Millar, H. W. Squires.

Member Grade

Harding, R. W., Forester, Newport Industries, Inc., DeQuincy, La.; Amherst College, B.A., (Liberal Arts), 1939; Yale, M.F., 1941. Gulf States (Jr. member, 1941).

Silker, T. H., Research Tech., Texas Forest Service, Kirbyville, Texas; Iowa State, B.S.F., 1940; M.F., 1941. Kentucky-Tennessee (Jr. member, 1942).

Inland Empire

Junior Membership

Enke, W. C. A., Forestry Aid, U.S.F.S., Grangeville, Idaho; Mont. State, B.S.F., 1946. J. C. Crupper, Jr., A. N. Cochrell, C. L. James.

Petersen, S. S., Forester, U.S.F.S., Grangeville, Idaho; Univ. of Calif., B.S.F., 1948. R. B. Jorgensen, W. E. Green, J. C. Crupper, Jr.

Member Grade

Galbraith, M. C., Dist. Forest Rgr., U.S.F.S., Grangeville, Idaho; Univ. of Idaho, B.S.F., 1937. Inland Empire (Jr. member, 1943).

Lynch, D. W., Silvic., U.S.F.S., Spokane, Wash.; Mont. State, B.S.F., 1939; Duke, M.F., 1940. Inland Empire (Jr. member, 1939).

Meneely, J. F., Dist. Forest Rgr., U.S.F.S., Sandpoint, Idaho; Univ. of Idaho, B.S.F., 1938. Inland Empire (Jr. member, 1941).

New England

Affiliate Membership

Hamlin, Mark E., Chief, Woods Dept., Brown Co., Berlin, N. H.; Bowdoin College, B.S., 1936. New England.

Junior Membership

Duckett, H. E., Jr., Vermont Forest Service, Montpelier, Vt.; N. Y. State, B.S.F., 1949. J. S. Illick, L. P. Plumley, J. E. Davis.

Knight, F. B., Instructor in Ento., Univ. of Maine, Orono, Me.; Univ. of Me., B.S.F., 1949. G. L. Chapman, H. A. Plummer, R. I. Ashman.

McConkey, T. W., Silvic., N. E. Forest Exp. Sta., Phila., Pa.; Cornell Univ., B.S.F., 1932; M.F., 1933. Reinstatement.

Morton, Paul, Resident Mgr., Draper Corp., Guilford, Me.; Univ. of Me., B.S.F., 1931. Reinstatement.

Rice, J. P., 350 Main St., Fitchburg, Mass.; Univ. of Me., B.S.F., 1949. G. L. Chapman, F. K. Beyer, R. I. Ashman.

Welch, J. C., Forester, Eastern Corp., Brewer, Me.; Univ. of Me., B.S.F., 1949. R. I. Ashman, A. G. Randall, H. A. Plummer.

New York

Junior Membership

Bear, D. H., Student, N. Y. State, Syracuse, N. Y.; Va. Poly. Inst., B.S., (Forestry), 1942; N. Y. State, M.F., 1949. J. S. Illick, L. P. Plumley, J. E. Davis.

Losee, S. T. B., Air Photo Survey, Abitibi Power & Paper Co., Sault Ste. Marie, Ontario, Canada; Univ. of Toronto, B.S.F., 1931. New York.

Remele, K. E., 22 Stratton Place, Delmar, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, L. P. Plumley, J. E. Davis.

Schroeder, R. L., Davenport Ave., New Rochelle, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, L. P. Plumley, J. E. Davis.

Shellstrom, Walter N., Jr., Student, N. Y. State, Syracuse, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, L. P. Plumley, J. E. Davis.

Thomson, R. W. B., Plant Forester, Ontario Paper Co., Heron Bay, Ontario, Canada; Univ. of N. B., B.S.F., 1943. New York.

Wiener, Leo, 571 East 170 St., New York, N. Y.; N. Y. State, B.S.F., 1947. J. S. Illick, L. P. Plumley, R. M. Hutchinson.

Youngs, G. J., Dist. Rgr., N. Y. State Cons. Dept., Albany, N. Y. New York (Af.45R48).

Northern California

Affiliate Membership

Tomblin, J. W., Asst. Deputy State Forester, Calif. State Div. of Forestry, Sacramento, Calif. Northern California.

Junior Membership

Akers, J. S., Forestry Asst., Diamond Match Co., Sterling City, Calif.; Univ. of Calif., B.S.F., 1949. Myron Krueger, Emanuel Fritz, J. A. Zivnuska.

Garbutt, P. N., Princeton, Calif., Univ. of Calif., B.S.F., 1949. F. S. Baker, P. M. Barr, Myron Krueger.

Holmes, O. L., Fire Control Asst., U.S.F.S., Mt. Shasta, Calif.; Colo. A. & M., B.S.F., 1949. J. W. H. Charlton, M. S. Abell, C. A. Abell.

Northern Rocky Mountain

Junior Membership

Jones, H. E., Forester, Bur. of Land Mgmt., Billings, Mont.; Mont. State, B.S.F., 1938. Reinstatement.

Mlynek, William, Asst. Rgr., Rexford Dist., Kootenai Natl. Forest, Rexford, Mont.; Mont. State, B.S.F., 1948. A. B. Gundersen, S. B. Hutchinson, A. L. Roe.

Ozark

Junior Membership

Elwert, F. P., Asst. Block Supv., Crossett Lbr. Co., Crossett, Ark.; Columbia Univ., A.B. 1942; Yale, M.F., 1948. S. V. Sihvonen, G. D. Hartrick, R. C. Hawley.

Puget Sound

Junior Membership

Anderson, J. F., Land Examiner, Weyerhaeuser Tbr. Co., Chehalis, Wash.; Univ. of Minn., B.S.F., 1948. J. G. Miles, P. G. Lauterbach, V. W. Bousquet.

Clawson, R F., 3216 N. 32nd St., Tacoma, Wash.; Univ. of Maine, B.S.F., 1949. F. K. Beyer, H. A. Plummer, R. I. Ashman.

Williams, W. C., Clerk Forester, U.S.F.S., Seward, Alaska; Oregon State, B.S.F., 1948. V. T. Heath, W. F. McCulloch, W. I. West.

Southeastern

Junior Membership

Johnson, James W., Chief, Forestry Section (U.S.A.F.), Englin Air Force Base, Florida; Univ. of Mont., B.S.F., 1929; Univ. of Tenn.; M.S., 1933. F. J. Ruff, H. F. Wise, W. O. Stewart.

Southern California

Junior Membership

Larson, R. L., 301 E. Artesia, N. Long Beach, Calif.; Oregon State, B.S.F., 1949. J. R. Dilworth, H. G. Nettleton, W. F. McCulloch.

Southwestern

Junior Membership

Bade, Gordon H., Forester, Apache Natl. Forest, Springerville, Ariz.; N. Y. State, 1918. Southwestern.

Day, E. V., Range Supv., Indian Service, Keams Canyon, Ariz.; Utah State, B.S.F., 1937. Reinstatement.

Johnson, Norman E., Forestry Aid, U.S.F.S., Coconino Natl. Forest, Flagstaff, Ariz. Southwestern.

Lewis, H. G., Landscape Architect, U.S.F.S., Tucson, Ariz.; N. Y. State, B.S.F., 1930. R. D. Morris, C. P. Merker, L. J. Putsch.

Schilling, Erwin A., Asst. Regional Forester, U.S.F.S., Albuquerque, New Mexico; Colo. Agric., B.S.F., 1926. Reinstatement.

Upper Mississippi Valley

Junior Membership

Ahlgren, Clifford E., Forester, NorthWoods Trading Co., Ely, Minn.; Univ. of Minn., B.S.F., 1948. D. M. Stewart, R. M. Brown, J. H. Allison.

Rickert, L. H., Rgr., I.R.R.C., Hibbing, Minn.; Univ. of Minn., B.S.F., 1948. P. J. St. Amant, Lynn Sandberg, J. M. Kittelson.

Washington

Associate Membership

Rochester, D. M., Field Director, American Forest Products Industries, Washington, D. C.; Mich. State College, B.S., (Agric.), 1932. Washington.

Wisconsin-Upper Michigan

Junior Membership

Limpert, C. E., Dist. Forester, Mich. Dept. of Cons., Lansing, Mich. Wisconsin-Upper Michigan.

Foreign

Junior Membership

Harrison, D. B., Office Mgr., I. T. Williams & Sons, New York, N. Y. L. W. Huntington, J. F. Dubuar, P. J. Haddock.

Member Grade

Sydansk, Raymond, Branch Mgr., Armstrong Cork Co., Tabarka, Tunisia; N. Y. State, B.S.F., 1934; M.S., 1936. J. F. Shanklin, J. D. Coffman, R. W. Smith.

Corresponding Membership

Souza, Paulo F., Chief, Div. of Natl. Parks, Rio de Janeiro, Brazil; Piracicaba Normal School, B.S. 1914; Yale, (2 yrs.). Committee on International Relations.

The following have been Junior members for at least 6 years and are eligible for automatic advancement to Member grade. The Sections have certified them as actively engaged in forestry work and competent to represent the profession honorably and capably in the performance of their duties.

Gulf States

Stewart, Bruce F., Forester & General Mgr., Independent Pulpwood Producers, Inc., Cleveland, Tenn.; Univ. of Ga., B.S.F., 1939. Gulf States (Jr. member, 1940).

Kentucky-Tennessee

Carothers, J. Edwin, Forester, Alpine Forest Reserve, Alpine, Tenn.; Univ. of Mich., B.S.F., 1937. Kentucky-Tennessee (Jr. member, 38R43).

New York

Walker, Alexander, Supv., Wood Digestion, Eastman Kodak Co., Rochester, N. Y.; Univ. of Me., B.S.F., 1943. New York (Jr. member, 1942).

Washington

Carey, Dudley C., Commodity Spec., Navy Dept., Washington, D. C.; Pa. State, B.S.F., 1938; Yale, M.F., 1939. Washington (Jr. member, 1938).

Overly, Fred J., Chief, Real Estate Branch, National Park Service, Washington, D. C.; Univ. of Wash., B.S.F., 1932; M.F. 1933. Washington (Jr. member, 1932).

Elections to Membership

Affiliate

Bradeen, Cecil R., Me.
Churchill, P. W., N. H.
Glasgow, J. A., Me.
Kessler, J. S., Calif.
Kirk, P. R., Wash.

Associate

Harris, C. R., Canada

Junior

Anderson, R. H., N. Y.
Arlen, W. H., Ark.
Bozett, W. J., Ohio
Brogan, P. D., Ore.
Brooks, R. O., Pa.
Burniskey, A. T., Ore.
Cohen, A. J., Conn.
Coville, S. B., N. H.
Cox, G. S., N. C.
Cravens, J. H., Ariz.
Donaldson, D. J., Jr., Tex.
Fischer, R. F., Mass.
Harley, B. R., Ga.
Herlevick, V. W., N. C.
Hughes, R. T., Calif.
Jackson, R. H., Ariz.
Lewis, J. G., Utah
Marra, J. A., W. Va.
Neumann, P. O., Ariz.
Pierce, J. L., Miss.
Pomerening, D., S. C.
Pomeroy, L. K., Ark.
Rice, W. W., Conn.
Roggie, R. J., N. Mex.
Shields, C. A., Ariz.
Stiteler, W. M., W. Va.
Streets, Leo V., Me.
Tefft, L. J., N. Y.
Walt, H. R., Calif.
Wardell, F. S., N. Y.
Warren, C. J., Mont.
Watson, J. B., Ore.
Weeden, N. P., N. Mex.
Wentz, W. W., Pa.

Senior

Barrett, J. W., N. Y.
Chatfield, E. E., Miss.
Condit, G. R., Ark.
Groves, B. V., Wyo.
Haines, A. L., Wyo.
Helmick, K. J., Colo.
Hill, M. R., S. D.
Johnson, E. W., Okla.
Johnson, S. S., Calif.
Kennedy, W. J., Ariz.
McCowan, I. F., N. Y.
Marsh, R. B., Calif.
McGinnies, W. G., Colo.
McLees, K. C., Calif.
McMasters, W. C., Ohio
Nietzold, G. E., Ky.
Otto, A. W., Calif.
St. Amant, Paul J., Minn.
Schlobohm, D. F., Calif.
Sears, E. W., N. Y.
Stradt, G. H., Ark.
Twerdal, M. P., Conn.
Vardaman, J. M., Mo.
Winkelman, H. G., Calif.
Ziminski, H. V., Minn.
Zivnuska, J. A., Calif.

Reinstated

Junior

Elsbree, C. C., N. Mex.
Grossenbach, P. A., Utah
Jones, W. D., Va.
Peck, H. H., Ohio
Wetzel, W. W., Ore.

Senior

Mitchell, J. N., Calif.
Simmons, F. C., Pa.
Vaux, C. H., Minn.

Forestry News

Compiled by ROBERT D. HOSTETTER, *Assistant Executive Secretary*

Seedlings Sent to Italy By Conservation Agency

The Conservation Commission of West Virginia is undertaking to help Italy find a strain of blight resistant chestnut to replace its native species now rapidly disappearing due to a disease similar to one which has virtually wiped out all native chestnut trees in the United States.

From the commission's tree nursery at Lesage, 500 seedlings of the Nanking strain of Chinese chestnut were dispatched by air express to the Italian ministry of agriculture in Rome. The year-old plants were sent in response to a request to Director C. F. McClintic from Walter J. Quick, Jr., American forestry consultant in Italy.

Quick said that the chestnut, which formerly occupied an important place in Italy's economic life, had been almost completely destroyed by the blight. In Italy, chestnuts were a staple food item, a major use being for bread, the nuts first being ground into flour.

The blight has also invaded the English oak, an important timber tree in Italy similar to the American post oak.

Consultation Service Offered

The Committee on Conservation Education, headed by Glenn O. Blough, of the Office of Education, Washington, D. C., is prepared to (1) review conservation materials being developed and make suggestions for adopting them to the needs of schools, (2) aid in planning the preparation of conservation films, review scripts, and provide information on kinds of films needed, and (3) discuss with other agencies the ways in which those agencies can contribute to conservation education.

Forestry Pioneer Honored

Dr. Edmund Secrest was presented with an honorary vice presidency for life at the annual meeting of the Ohio Forestry Association held in Columbus on January 14.

He pioneered the development of forestry in Ohio and served as the first state forester until he was made director of the Ohio Agricultural Experiment Station.

Post Feature Describes Work of Forest Ranger

Lee Luckenbill, ranger on the Clarks Fork District of the Shoshone National Forest near Cody, Wyo., was the subject of a feature story in the *Saturday Evening Post's* "Men at Work" series, which appeared in the January 8 issue. The article described Luckenbill's range, game, timber sale, and other duties on the 502,000-acre district.

Author Richard Thruelsen emphasized Luckenbill's close contact with the owners of 5,200 cattle and 10,000 sheep grazed on the district. Raised on a Colorado ranch and a graduate in forestry from Colorado A & M College in 1934, Luckenbill is familiar with the problems of stockmen, who in turn respect his administration of range and timber lands.

Survey of Wood Wastes Made

The Federal Reserve Bank of Boston has made a grant to the Northeastern Wood Utilization Council whereby Edward S. Sowinski will spend three months visiting sawmills and wood-working plants in New England to secure information on the quantity and type of wood waste available for utilization in recently developed processes to manufacture wallboard, tannin, and other products.

Western Forest Nurserymen Hold Meeting in Seattle

Nurserymen from all state, private and federal forest nurseries in Washington, Oregon, California, Idaho, Montana and British Columbia, representing 15 nurseries with a combined annual capacity of 60 million seedlings and transplants, held a two-day meeting at the College of Forestry, University of Washington, in Seattle on January 17 and 18. Subjects discussed were nursery equipment, weed control, irrigation, maintenance of soil fertility, seed stratification, stock distribution—lifting and grading, propagation of hardwoods, nursery insects and control measures, and nursery diseases and control measures.

L. T. Webster, Assistant state forester for Washington, and chairman of the nursery practice subcommittee of the western Forestry and Conservation Association presided as chairman. The delegates voted to make the meeting an annual event.

Laboratory Gives Kiln Course

Another two-week demonstration in the kiln drying of lumber will be given at the Forest Products Laboratory, from April 25 to May 6, Director George M. Hunt has announced.

Enrollment will be limited to 40 persons who should apply to the director of the laboratory at Madison 5, Wis. A fee of $150 to cover the cost of the demonstration will be charged each student.

Considered during the course will be basic principles of seasoning wood, types of kiln equipment, kiln operation, drying schedules, and other phases of kiln drying. Air seasoning and lumber storage will also be discussed.

Forestry Legislation

Forest

H.R. 2296, introduced by W. K. Granger of Utah on February 3, and H.R. 2001, introduced by Robert Sikes of Florida on January 31, along with several other identical or similar bills were considered at a public hearing on February 24 by a sub-committee of the House Committe on Agriculture which was headed by Mr. Granger.

H.R. 2296, which includes the provisions of H.R. 1969 as reported last month, would amend the Clarke-McNary Act of June 7, 1924 (43 Stat. 653) to provide additional funds for fire control, reforestation, forestry extension, and technical services in Federal-State cooperation. Appropriations would be increased from the present $9,000,000 annually at the rate of $2,000,000 a year until a maximum of $20,000,000 is reached in carrying out revised provisions of the Clarke-McNary Act. A new section (10) would be added which provides for furnishing technical services to forestland owners in managing, harvesting, marketing, and utilizing forest products. Graduated appropriations to reach $6,000,000 annually in 1953 would be authorized.

Testifying in favor of such legislation were the Association of State Foresters, the U.S. Forest Service, the Society of American Foresters, the Forest Farmers Association, the American Forestry Association, Land Grant Colleges, other organizations, and of particular interest to the sub-committee—several Virginia farmers who had benefitted from services of foresters in the state organization. Richard Colgan, of the National Lumber Manufacturers Association, objected to so much federal money being spent in an endeavor not necessarily requiring federal promotion. Materials regarding wise forest use which had been prepared by forest industries were submitted to the sub-committee. Additional time was granted to N.L.M.A. to prepare an estimate of what it considered appropriate federal expenditures toward state cooperation in forestry would be.

If enacted, the legislation would mean jobs for some 3,000 more extension and farm foresters.

H.R. 2001, also favored by most witnesses, provides for funds to complete and maintain a nationwide forest survey by the U.S. Forest Service and cooperating agencies.

Range

S. 838 (By Johnson of Colorado) provides for investigations and experiments into problems relative to maintaining productive meadows at high altitudes. Referred to Committee on Agriculture and Forestry on February 7.

Wildlife and Recreation

S. 728 (By Butler of Nebraska) and H.R. 1389 (By LeFevre of New York) would authorize the participation of states in revenues from areas administered by the Nationl Park Service.

Jurisdiction

H.R. 2361, the executive department reorganization bill, passed the House by a vote of 356 to 9 on February 7 and is now being considered by the Senate Committee on Expenditures in the Executive Departments. S. 526 to cover the same provisions is also before that committee.

Development

Several bills to encourage the settlement and development of Alaska, including provisions for building a railroad there, constructing homes, allowing homesteading, and for sale of public lands in Alaska have been introduced.

Shelterbelts Protect Cattle

It is reported that tree shelterbelts in the blizzard-swept plains states were effective in saving thousands of cattle from death in last winter's severe storms. Cattle which huddled along belts of trees were protected from the driving winds.

Lumber Production and Prices From 1799 to 1946 Compiled

United States lumber production and prices by years for the period from 1799 to 1946 as reported to the Bureau of the Census or to the Forest Service, with revised production estimates by the Forest Service for certain years when reports are believed to have been inadequate, has been published by the Department of Agriculture.

The volume, miscellaneous publication No. 669 entitled "Lumber Production in the United States, 1799-1946," contains a foreword and 227 pages of tables. It was compiled by Henry B. Steer, forest economist with the Forest Service.

The production and price data is given by species, states, regions and national totals, and is intended primarily as a working tool for foresters, economists, and lumbermen.

"Lumber Production in the United States, 1799-1946" is for sale by the Superintendent of Documents, Government Printing Office, Washington, D. C., at two dollars per copy.

Pakistan Trains Foresters

Pakistan Forest College has recently been established at Upper Topa, four miles beyond Muree, at the foot of the Kashmir mountains.

The teaching staff has been built from Muslin officers previously serving in the United Provinces and on the Forest Research Institute staff at Dehra Dun.

Mechanical land reclamation work will form an important item in the curriculum which is designed to train forest officers and rangers.

In the Muslim Provinces each civil district is to have its own forest officer, who will be responsible for large private forestry and soil conservation developments as well as the improvement of old forest reserves and civil rakhs. An afforestation target of 20 percent is planned, as compared with present provincial forestation of only 2 percent.

Snows Create Flood Hazard

Sufficient water supplies for practically all parts of the West and prospects for damaging spring high water flow in the Northwest and parts of the Rocky Mountain states are foreseen from the February 1 snow surveys, according to the Soil Conservation Service's Division of Irrigation and Water Conservation. The service is responsible for Coordinating snow cover information gathered monthly each winter by this and other federal, state, and local agencies and for preparing and issuing water supply forecasts for agricultural and other purposes in the western states.

Water content of the snow cover on major watersheds was given as about 200 percent above normal in the Columbia Basin; 150 percent above normal on the headwaters of the Missouri River; 175 percent above normal in the Great Basin and the Upper Colorado, and normal on the Rio Grande, Arkansas, Salt, Gila, and in southern California.

Northern Tree Line Advancing

Prof. Andrea Michae, French ethnologist and expert on the arctic, said recently that the advancing tree line in the Ungava region of northern Quebec may be one indication that the climate is becoming warmer there. Where trees have been mere skeletal dwarfs they are growing larger. At the same time, the lakes of the region are drying up.

One possible cause of the change may be a variation in the radiation of heat from the sun, which has occurred more or less rhythmically during past centuries as evidenced by studies of tree rings and fossil remains.

Another possibility is that movements of the bottom of the Greenland Sea appear to be occurring, resulting in a change in the course of the Gulf stream with corresponding climatic changes.

Woolfolk Named Range Chief At Missoula Research Station

Edwin J. Woolfolk has been appointed chief of the Division of Range Management Research at the Northern Rocky Mountain Forest & Range Experiment Station, Missoula, Mont., according to an announcement by Chas. L. Tebbe, Director. Woolfolk succeeds Leon C. Hurtt, who for many years headed range research in the Northern Region and who was recently promoted to be a special staff assistant to Walt L. Dutton, chief of the Division of Range Management at Washington.

EDWIN J. WOOLFOLK

Mr. Woolfolk's first Forest Service job was with the Northern Rocky Mountain Station in 1932, following graduation from the University of Montana where he majored in range management. Born and raised on a cattle ranch near Mona, Wyo., upon the death of his father he operated and managed the ranch as a livestock enterprise for 3½ years before entering the University.

Assigned to range management and reseeding studies designed to determine the best rate of stocking on northern Great Plains ranges and the effect of too heavy stocking on soils, range vegetation and the livestock itself, at the Miles City, Mont. branch of the experiment station, he was placed in charge of the branch 3 years later. Except for one year spent in graduate work at the University of Minnesota, he remained in that position until his 1946 transfer to Washington. He served 3 years in Washington as assistant chief of the Division of Range Research, where he was actively engaged in development and administration of the overall Forest Service range research program.

Goodspeed Goes to Morgantown

Allen W. Goodspeed has taken the position of professor of forest management and director of the Coopers Rock Experiment Forest at the West Virginia University forestry school, Morgantown.

Mr. Goodspeed graduated from Yale in 1929. He was employed as a private forester for Ritchfield Forestry Association and served as an instructor in forest management subjects at Yale. Formerly associate professor of forest management at the Maine forestry school from 1934 to 1938, he has since been professor of forestry at Iowa State College.

He succeeded Lowell Besley who now heads the Forestry Department at the University of British Columbia.

Binocular Construction Told

"The Inside Story of Binoculars" by The Reicherts of the Mirakel Repair Co., Mt. Vernon, N. Y., for sale by that firm for 25 cents, contains authoritative information valuable to foresters when it comes to choosing or caring for binoculars.

Excessive eye-strain experienced by fire lookouts is often attributable to improperly adjusted glasses, according to the authors.

The construction of binoculars, including lens coating, and a comparison of similar models by various manufacturers is also presented.

Forest Service Clamps Down On Smoke-Jumping Exhibitions

Because of the hazards involved during public demonstrations at county fairs and other public gatherings of the smoke-jumping and cargo-dropping operations used in fighting forest fires in western states, the U. S. Forest Service has been compelled to establish a national policy virtually barring the granting of the increasing number of such requests, according to Carl A. Gustafson, fire control chief.

Since the smoke-jumping force was first established with 10 jumpers in 1940, the corps has become an increasingly effective arm of the Service in fighting western forest fires. During the past year, the Service employed 244 jumpers, distributed as follows: Missoula, Mont., 140; McCall, Idaho, 42; Idaho City, Idaho, 10; Winthrop, Wash., 28; Cave Junction, Ore., 24; and Deming, New Mex., 8.

The smoke-jumpers were dropped from planes on 94 fires in inaccessible territory, making in all 566 individual jumps. They put in 2,250 man-days of work on fires to which they jumped. In addition, 146 of the smoke-jumpers performed 667 man-days of fire fighting on blazes to which they were taken by automobile rather than by plane. During the past season, Forest Service planes dropped 346,924 pounds of supplies and equipment to men fighting fires in relatively inaccessible areas. Net savings in fire fighting funds due to the use of smoke-jumpers last year were estimated to be $131,434.

Premium Paid For Short Logs

Alex Conrad, who owns and operates the Conrad Hardwood Products Company at East Flat Rock, N. C., pays five dollars per thousand board feet more for short logs than for long ones.

Purchasing hickory under detailed specifications, he finds that by buying bolts which are 3½ feet long (for manufacture into pickerstick blanks) he can grade them more closely and be more sure of what he is buying. It also encourages full utilization of tree stems.

Because wood from rapidly growing trees has higher specific gravity and consequently greater toughness, Conrad specifies that hickory logs must have not more than 17 annual rings per inch. Wide sapwood is also an indication of rapid growth so logs having four or more radial inches of white on the small end, with 14 or less rings per inch, and no knots, rot, bird pecks or other defects bring a premium price. White and red hickory of the same specific gravity have equal toughness properties, but the traditional reluctance of handle manufacturers and tool users to use red hickory still prevails.

Material not suitable for manufacture into pickerstick blanks is used in producing rough, air-dry blanks for industrial and agricultural tool handles which Mr. Conrad ships mainly to England. Ladder round squares and drumstick squares are cut from material not suitable for other uses.

Pickersticks, which are used to drive the shuttles to and fro on looms, are cut from blanks 1¼"x2"x 36" or 40".

Mr. Conrad secures an 80 percent log utilization for blanks and squares, sells slabs for fuelwood, and ships sawdust to meat curing firms, recently as far away as Los Angeles, Calif.

Forestry Group Elects Spurr

A. C. Spurr, president of the Monongohela Power Company, of Fairmont, West Virginia, was elected president of the American Forestry Association in February. He succeeds W. S. Rosecrans of Los Angeles, Calif.

As nineteenth president, he will direct the American Forestry Association's long-range program of education which seeks to stimulate better management and use of the nation's forests and related resources.

Tarkiainen Joins FAO Staff

Dr. Tutu Tarkiainen of Finland has recently joined the staff of the Division of Forestry and Forest Products in the Food and Agriculture Organization of the United Nations at Washington, D. C.

Statistical aspects of worldwide forestry and forest products problems will be his major concern.

Although without professional training in forestry his previous experience has dealt primarily with wood industries and international trade. During the past three years he was employed by Enso-Gutzeit, the largest harvester and manufacturer of forest products in Finland. Prior to that he served with the association of Finnish woodworking industries and spent ten years with the diplomatic service of Finland, being stationed in Rome, Moscow, and other European cities.

Snow Unmoved by 105-mm. Gun

Cooperation by the 168th Field Artillery Battalion with the U. S. Forest Service in an attempt to start a man-caused avalanche of snow in Hoop Creek Basin near Berthand Pass in Colorado to make the area safe for skiers resulted in failure.

Twenty-rounds from a 105-millimeter howitzer lobbed over 12,000-foot Russell Mountain into eight-foot-deep snow slopes of Hoop Creek Basin produced negligible results. Fourteen more shots fired point blank were equally ineffective in starting a snow slide.

The Swiss reportedly have had good success with this method of removing avalanche hazards from winter sports areas.

Bruce Revises Yield Tables

Donald Bruce, collaborating with the Pacific Northwest Forest and Range Experiment Station, has recently compiled "A Revised Yield Table for Douglas-fir" in which average stand diameter was used as the independent variable in considering normality of stocking.

Coulter Says Education Pays

Florida State Forester C. H. Coulter maintains, "Educational efforts do pay off!" In support of that assertion he relates the following incident:

"Near Tallahassee, a Ft. Braden school bus of youngsters spotted a small but spreading woods fire. The bus driver, on their request, agreed to stop. They broke branches from trees and in a few minutes whipped out the fire which would have caused considerable damage. In their instruction, or from a fire prevention movie, they got the idea that wildfires were harmful and the alert pupils went into action."

Technical Aid Directories Published in Southern States

After working together for several years on a study of government in the South, the Universities of Alabama, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, the Tennessee Valley Authority, and other cooperating agencies have published for each of those states a directory of technical aids available to state officials and an analysis of the process by which technical assistance is channeled into state and local government.

Financial and staff contributions of the universities and T.V.A. were matched with funds supplied by the General Education Board. It is the second such cooperative project, the first being a study of the administration of natural resources in the South. Substantial monographs have been published concerning the problem in six of the southern states and a summary report is in the final stages of preparation.

The directories of technical aids list in detail all of the state, regional, and national agencies which can be called upon to assist in better administration. The agencies are classified by fields of activity, including natural resources, education, economic and industrial development, parks and recreation, fire protection, taxation, and others.

Further information can be obtained from the Institute for Research in Social Science, University of North Carolina, Chapel Hill, N. C.

Aspen Woodlands Yield Lumber

Aspen woodlands in the Turtle Mountains of North Dakota are proving to be an asset worth the application of forest management practices, to the surprise of most of the farm woodland owners, according to Floyd T. Ryan, farm forester at Bottineau.

Though isolated from usual aspen markets, local demand for aspen lumber provides an outlet for all that is manufactured.

A cruise of one owner's timber revealed that he can make an initial cut of 1,500,000 board feet on his 600-acre woodland and follow it with successive annual cuts of 50,000 to 100,000 board feet. The woodland owner, although previously inexperienced, set up a new sawmill with the help of the farm forester and is following a management plan in harvesting aspen sawlogs, some of which are 16 inches in diameter.

More intensive management and better utilization will be attained when an aspen defiberizer is installed, according to Ryan. It will permit the woodland owner to receive some return from the cutting of small and defective trees in an improvement cutting.

Accurately cut aspen lumber has been used for construction of homes in the Turtle Mountain area.

Balanced Farming Program Includes Forest Management

Missouri's "Balanced Farming Program" is one which includes the family, the home, and reaches out to cover every acre and every phase of the farm operation. This fact is again evidenced in the recent employment of a graduate forester as assistant county agent in Dent county. Mr. Harold G. Gallagher, who graduated from Missouri University with a B.S. degree in forestry in January, assumed his duties as assistant agent soon after graduation.

According to Extension Director J. W. Burch, the use of graduate foresters as assistant agents in the heavily timbered counties of the state appears to be a practical means of extending more help to the farmers who wish and need to include provisions for the production and management of timber crops in their regular "Balanced Farming Plans."

L. E. McCormick heads up the forestry work in the extension service at the University of Missouri.

Wood-Burning Furnace Used

Since the winter of 1926-27, Dr. C. E. Jenkins of East Westmoreland, N. H., has used a piped warm-air, wood-burning furnace, designed by himself, for heating a large country house. The wood is burned standing on end and fed down by gravity, the fire being confined to the lower end. Air for combustion is released into the chamber at a higher level than the outlet for the exhaust gases, approximately where the average wood distills. The furnace thus follows the slow combustion principle, with high efficiency in utilizing the heat value of the fuel.

Wood is used in random lengths up to eight feet, and one charge will burn for 24 hours.

Copies of a bulletin describing the furnace can be obtained for 25 cents each from the Northeastern Wood Utilization Council, Inc., P. O. Box 1577, New Haven 6, Conn.

Research Society Plans Meet

Technical development of research, raw material and its preparation, furniture and plywood, chemical utilization of wood, machining of wood, and seasoning will be major topics considered at the annual meeting of the Forest Products Research Society to be held on May 2-4 at Grand Rapids, Mich.

All persons interested, whether members or not, are welcome to attend the meeting, according to C. E. Van Hagan, secretary-treasurer.

Roll Roofing Under Houses Saves Wood and Metal, Too

Ordinary asphalt-coated roofing unrolled on the soil under houses without basements was announced two years ago by the U.S. Department of Agriculture as a means of keeping down moisture and preventing rot of floors and timbers. It now proves to also reduce deterioration of wiring, steel members, and other parts and to thus preserve buildings longer.

According to Dr. J. D. Diller, forest pathologist of the Department's Plant Industry Station, evidence is accumulating that where the soil is covered, the air in the "crawl spaces" under houses is much drier. "Sweating" or condensation of moisture has not been found in a single case where this precaution has been taken. This means less rusting of steel, less deterioration of insulation materials, and less chance for the buckling of floors or short-circuiting of electric wiring that sometimes occurs in moist spaces. He says that various Government housing agencies and house occupants have reported favorable effects from this simple moisture control, and its use is extending. Occupants of basementless houses are finding that the soil cover makes crawl spaces dry enough for storing garden tools, lawn mowers, lumber, and even surplus furniture.

Where the roll roofing is used to cover the soil under basementless houses, Dr. Diller says it is not necessary in winter to have numerous open ventilators and the resulting cold floors. Where the soil is well covered with the asphalt-coated roofing, ventilation can be cut down 90 percent, according to a recent recommendation by the U.S. Housing and Home Finance Agency which has also tested this method in a large-scale housing development.

Foresters Seek S.A.F. Job Help

During recent months displaced European foresters, including 18 Estonians, 2 Poles, and 2 Latvians, have sought the services of the Society of American Foresters in obtaining employment in the United States.

Little tangible assistance has been possible, because, in general, U. S. employers of foresters prefer men who are familiar with the timber, policies, and markets of this country. Many of the European foresters have had professional training and numerous years of experience; they speak English; and their records indicate that they are hard workers. However, the active file of U. S. and Canadian foresters who have requested assistance of the Society of American Foresters in finding changes of employment now lists forty persons.

Less than a dozen specific openings for foresters are currently known to the executive office, although there actually may be considerably more.

Frequently the Society is able to put prospective employers and employees in contact with each other to their mutual satisfaction. Continued success of S.A.F. employment depends upon the cooperation of all concerned.

As a service to the profession, the Society of American Foresters publishes employment advertisements for employers and members in the JOURNAL OF FORESTRY without charge. Ad copy must be submitted before the fifteenth of the month, six weeks before date of publication.

Demand for Wildlife Men Shows Increase in Canada

J. M. MacLellan of the Dominion Wildlife Service authoritatively states in the February issue of *Forest and Outdoors* that present indications show a demand in Canada for qualified wildlife biologists that will likely exceed the supply for some time to come.

In the article titled "Want a Job in Wildlife Management?" he reports that the Dominion Wildlife Service has greatly increased its staff and that further expansion is expected. The Provinces maintain their own wildlife management agencies. Universities, museums, and private conservation organizations now employ experts in every branch of wildlife biology, and opportunities for employment of qualified graduates by these organizations may be expected to show a continual increase in number, he said.

Quetico-Superior Film Ready

"Wilderness Canoe County," a 16 mm. color film with commentary and background music is now available for rental or sale. With a running time of about 30 minutes, the film portrays the story of a father who, after many years, takes his son back to enjoy the Quetico-Superior canoe country, only to find that the inroads of civilization have changed it from the wilderness he had known.

Inquiries should be directed to the President's Quetico-Superior Committee, 919 North Michigan Avenue, Chicago 11, Ill.

Uses of Larch Illustrated

Publication of a new book covering the properties, uses, and grades of western larch lumber has been announced by the Western Pine Association.

With 52 pages, the book includes full page pictures of typical pieces of each grade accompanied by text material describing the illustrated examples.

Posts Boiled in Water Take Oil Soluble Preservatives

"The Boiling-in-Water Method of Treating Southern Pine Fence Posts" is a recent bulletin of the University of Georgia in Athens.

In using that method the posts are heated in boiling water to expel air and are then placed in a preservative solution which is drawn into the wood as it cools. Tests were conducted with solutions of coal-tar creosote and copper napthanate in fuel oil, and it is thought that pentachlorophenol in fuel oil would be equally adapted to the method.

The method has the advantages of reducing preservative loss by evaporation, insures accurate heat control, and lessens fire hazards present when the hot and cold preservative bath treatment is used.

G. A. Pearson (1880-1949)

G. A. Pearson, for many years senior silviculturist at the Southwestern Forest and Range Experiment Station, died on January 31, 1949.

Although born and schooled in Nebraska, he spent the last forty years of his life in the Southwest. Honored by election as a Fellow in the Society of American Foresters, he had maintained membership during his entire professional career.

Author of many technical articles dealing mainly with ponderosa pine, he was recognized as a leader in the silvicultural branch of forestry.

Fuel Moisture Reduces Fires

A study of daily fuel moisture indicator stick readings, by William G. Morris of the Pacific Northwest Forest and Range Experiment Station, revealed that the fewer number of forest fires in Washington and Oregon during 1948 was attributable largely to higher fuel moisture contents than had prevailed for a number of years.

D. W. Gossard, widely known sales manager of the White River Lumber Company at Enumclaw, Wash. was elected president of the West Coast Lumbermen's Association at the 38th annual meeting held in Portland, January 27-28. He will head up an intensive drive of western lumbermen to merchandise lumber and retain its place as the country's principal building material.

W. B. Greeley was re-elected vice-president. George Flanagan, an S.A.F. Member, and Edmund Hayes, an Associate Member, are directors.

Michigan Legislation Requires Fire Permits

Pending before the Michigan state legislature is a bill which would require a permit for all open fires when the ground is not snow-covered. The proposed legislation also would allow collection of costs incurred in suppressing fires resulting from carelessness and negligence, and would permit the court to use its discretion in assessing a penalty commensurate with the seriousness of the offense.

The Michigan Department of Conservation points out that knowledge of to whom permits have been issued will enable it to answer fewer false-alarm fires.

Alabama has a similar law which requires all persons contemplating the use of open fires to obtain a permit, in all counties under fire protection. Other states also require brush burners to have permits.

Foresters in the News

JAMES W. OWENS, JR., who was ranger on the Kiamichi district of the Ouachita National Forest, has accepted employment with the Gulf States Paper Corporation at Tuscaloosa, Ala.

REYNOLDS B. SMITH has been appointed associate professor of forestry at the University of Florida where he is teaching wood technology. He received the Ph.D. degree from the New York State College of Forestry in 1948.

CHARLES F. SWINGLE, formerly located at Manhattan, Kan., has transferred to the Peninsular Experiment Station, Sturgeon Bay, Wis.

JOHN WAHL, former manager of the Vail-McDonald logging operations of the Weyerhaeuser Timber Company, has been transferred to the Tacoma office of the company, where he has assumed the duties of assistant manager of the lumber division, in charge of logging.

Xi Sigma Pi Honors Evans

Charles F. Evans, vice-president of the Society of American Foresters, was made an honorary member of Xi Sigma Pi, national honorary forestry fraternity, in initiation ceremonies held February 4, at the George Foster Peabody School of Forestry, University of Georgia.

Mr. Evans was elected unanimously by all 15 chapters of the nationwide fraternity. In the 40 years of the fraternity's existence, only 5 other men have been elected to honorary membership.

Now serving as assistant regional forester in charge of state and private forestry cooperation with the Southern Region at Atlanta, he entered the Forest Service in 1912. About one-half of his service with that agency has been in national forest administration in the West.

FAO Foresters Open Latin American Office

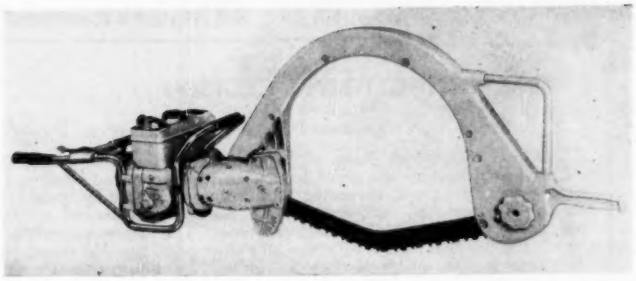
As an outgrowth of the FAO-sponsored Latin American Conference on Forestry and Forest Products held in Brazil last year, the Food and Agriculture Organization has established a Forestry Working Group for Latin America. Work will be under the direction of two forest technicians assigned from FAO's headquarters staff. Offices will be open shortly in Rio de Janeiro.

The Teresopolis (Brazil) conference, which brought the nations of Latin America together for the first time to lay plans for cooperative development of the continent's wealth of forest resources, proposed that the governments join in setting up a Latin American Forestry and Forest Products Commission. This Commission would consist of technical delegates from all Latin American countries.

It was suggested that FAO provide the technical secretariat of the Commission in the form of a working party made up of forest technicians. This plan was approved by the Fourth Annual FAO Conference in Washington last November, and FAO has now assigned Pierre Terver of France and Hans Scavenius of Denmark from its Forestry and Forest Products Division to get the work under way. Organization of the proposed Forestry and Forest Products Commission will follow soon.

It is expected that forest development work in Latin America will proceed along two closely related lines. One will be concerned with opening up untouched or little developed forests, thus stimulating the economic and social development of the Latin American countries. The other main line of approach will deal with the necessity for bringing these forests, and others already exploited, under proper management, both to avoid dissipation of forest resources and to check erosion.

McCulloch Announces New Saw



A new 20-inch, full-swivel bow saw, pictured above, designed to cut timber in any position without pinching, prying, or wedging, has been announced by McCulloch Motors Corporation, 6101 W. Century Blvd., Los Angeles 45, California.

This new model saves time in logging small timber, since it cuts rapidly through any type of wood, whether on the ground, propped at one or both ends, or swinging. The curve of the blade allows cuts to be made all the way through a log that is flat on the ground.

The bow is an aluminum-alloy casting and the chain track and blade are of tool steel. The entire saw weighs 63 pounds. Power is supplied by the same 5-hp unit used with the company's other chain-saw models, thus the bow can be interchanged with any length of straight blade and chain up to five feet.

Pennsylvanians Have Planted 190,000,000 Forest Trees

During the past 25 years land owners in Pennsylvania have planted about 190,000,000 forest trees, according to a new 34-page, illustrated booklet titled "Forest Trees to Plant in Pennsylvania" which was recently issued by the Bureau of Forests in Pennsylvania's Department of Forests and Waters.

How to select trees for planting, obtain seedlings from the six state nurseries, and then plant them are explained. Species available are red, white, Scotch, banks, and pitch pine; Japanese and European larch; Norway and white spruce; black locust; black walnut; white ash; sugar maple; yellow poplar; and several oaks, shrubs, and vines.

A similar publication, titled "Planting and Care of Forest Trees," has recently been issued by the Division of Forestry of the Oklahoma Planning and Resources Board, Oklahoma City. It describes the planting methods and species best adapted for windbreaks, post lots, forest improvement plantings, wildlife plantings, Christmas trees, and water erosion control.

Forest Service Pays Counties

Sharing payments amounting in the aggregate to approximately $6,000,000 will be 632 counties in 40 states, Alaska, and Puerto Rico in which national forests located there had receipts totaling over $24,000,000 last year.

Legislation requires that the Forest Service refund one-fourth of total receipts and specifies that the money is to be expended as the state legislatures may prescribe for the benefit of public schools and roads within the counties in which the national forests are located.

Largest payments go to Oregon, Washington, California, Idaho, Arkansas, Arizona, Colorado, Montana, and Mississippi, listed in descending order.

Association Lists Available

The West Coast Lumbermen's Association and the Western Pine Association on January 1 issued revised directories of their members which tabulate the capacity and products of each mill.

Copies are available by writing to the West Coast Lumbermen's Association, 1410 S.W. Morrison Street, Portland 5, Oregon, and to the Western Pine Association, Yeon Building, Portland 4, Oregon.

New McGRAW-HILL Books

HARVESTING TIMBER CROPS

By A. E. Wackerman, Duke University. American Forestry Series. In press.

A text covering all phases of harvesting, from preliminary considerations involved in planning and preparing for the actual harvesting steps, to cost controls and records. The final chapter, devoted to regional harvesting practices, was prepared by seven contributors, each an expert in his region. The subject of timber harvesting is treated as an integral part of forestry, rather than as an independent procedure. The author covers the harvesting of all important forest products such as saw logs, pulpwood, poles, ties, and veneer blocks. Throughout, the treatment is more analytical than descriptive. The illustrations are outstanding.

FIELDBOOK OF NATURAL HISTORY

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